Time Expectations:

Reading
1. Required

Mode of instruction:
- Better or Math Placement Test Results (ALEKS 50+)
- Peer students in certain introductory courses
- Supplemental Instruction: The goal is (CHM 151 Recitation email to set up a (notifying the instructor completing the Math Review assignment in Achieve by the deadline (Friday September 1st) without notifying the instructor will result in you being administratively DROPPED from the course.

Office Hours: Tues 1:00 – 2:00 p.m., Weds 2:00 – 3:00 p.m. and Thurs 11:00 a.m. – 12:00 noon (Office hours can be in-person or remote. You can drop by my office during the above times, or send an email to set up a Zoom session. You can also schedule an appointment to meet outside these times.)

Recitations: Thursday 2:45 – 3:35 and 4:00 – 4:50 p.m. Science and Health Room 433, 1-credit hour (CHM 151R) ALL students are encouraged to enroll in OR simply attend recitation. It is informal and the goal is to review and amplify lecture material while working problems. Recitation is not required.

Supplemental Instruction: The SI program is designed to provide academic assistance to all students in certain introductory courses. Michelle Malin (mam3372@nau.edu) is the SI leader for this class. The times and locations of SI sessions will be announced the first week of the semester.

Peer Assistants: Quinton Quelland (qoq3@nau.edu) and Hannah Terpning (hat63@nau.edu)

Prerequisites: One year of high school chemistry and MAT 108 or MAT 114 w/ a grade of C or better or Math Placement Test Results (ALEKS 50+) or International Exchange Student Group

Mode of instruction: Blended (3 hours in-person and 1 hour online per week)

Required Materials:  
- Textbook: Interactive General Chemistry Macmillan Learning, 2019
- Achieve system. The Achieve system contains the textbook for the class, as well as pre-lecture reading assignments and quizzes, links to video lectures, homework assignments and post-homework quizzes. Achieve is accessed using the link in Canvas (https://canvas.nau.edu/)
- Aktiv Chemistry. Enroll in Aktiv using the link in Canvas and bring your device to each class to work problems.
- Scientific Calculator. A basic model (available at stores for ~ $20) is best. It must handle scientific notation and fractional exponents. ALWAYS bring your calculator to class! No cell phones or computing devices may be accessible during exams.

Reading, Pre-lecture & Homework: It is of great importance that you read the text, actively listen to pre-lectures/take notes, & do homework as assigned. Much learning takes place outside of class. Showing up to every lecture (which you are required to do) does not guarantee a passing grade. You must come to class prepared, participate during class, & repeatedly practice outside of class.

Time Expectations: A typical student will need to spend a minimum of 2 hours studying for every credit hour. That’s an average MINIMUM of 8 hours of studying each week for this 4-unit class (in ADDITION to the “online” hour of lecture outside of class each week). This number will vary depending on skill and the material covered that week. Weeks with exams will require more time.
You should organize your schedule to study in **small** time blocks (<1 hour each) throughout the week. Studying in groups is **highly** recommended. Homework that relates to material covered in a particular lecture should be tackled **as soon as possible.**

**A suggested outside of class schedule for this course:**

a. ~20 minutes **each day** to work on portions of that week’s homework (may require **more than** 2 hours each week).

b. A **minimum of 60 minutes each week** to work through the recitation worksheet and check your solutions.

c. A couple hours **each week** to **read & listen** to assigned material (in bits, throughout the week). You may want to re-read after the topic is covered in class but reading is **NOT** studying (studying=working problems, explaining, summarizing…)

d. A couple hours to work with classmates, the SI, and/or a tutor **each week.**

e. A couple hours **each week** to work on the quiz OR rework recitation/exam/quiz/homework/etc. for exam preparation.

**Grading Policies:**

Your final grade in the class will be based on a total of 1000 points, calculated as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>% of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three midterm exams – scaled to 120 points each</td>
<td>36</td>
</tr>
<tr>
<td>Final exam – 200 points</td>
<td>20</td>
</tr>
<tr>
<td>Online homework <em>(Achieve)</em> – scaled to 140 points</td>
<td>14</td>
</tr>
<tr>
<td>ACS exam – up to 40 points extra credit</td>
<td>4</td>
</tr>
<tr>
<td>Quizzes <em>(Achieve)</em> – scaled to 140 points</td>
<td>14</td>
</tr>
<tr>
<td>Pre-lecture activities <em>(Achieve)</em> – 60 points</td>
<td>6</td>
</tr>
<tr>
<td>Participation/Attendance <em>(Aktiv Chemistry)</em> – 100 points</td>
<td>10</td>
</tr>
<tr>
<td>Total 1000 points + 40 extra credit</td>
<td>104 %</td>
</tr>
</tbody>
</table>

Letter grades will be calculated as follows. The percentages below represent “guaranteed” grades. These grade cut-offs may be lowered **slightly,** but will not be made higher than what is listed. Any lowering of the cutoffs will be minimal and completely at the instructor’s discretion. When deciding whether to “bump up” a student’s grade for a percentage less than one of the cutoffs below, the student’s exam scores will be the main factor considered.

- A ≥ 90%
- B ≥ 80%
- C ≥ 65%
- D ≥ 50%
- F < 50%

If it is important for you to obtain a certain grade in order to maintain good academic standing, keep a scholarship, be accepted to graduate or professional school etc…, then you should be working hard in the class the **whole** semester in order to earn the needed grade. We will do everything we can to help you be successful in the course, but ultimately it is up to you. Please do not come to the instructor at the end of the semester to “beg” for a certain grade. Such requests will **not** be considered.

**Note:** in the event of an extraordinary circumstance, including, but not limited to, an exam being cancelled due the campus being closed, the instructor reserves the right to modify the above grading scheme to one more appropriate for the new circumstances.

Please be aware that a grade of “C” or higher in CHM 151 is required in order to enroll in CHM 152.

**Participation:** Questions and assignments will be given in class on your electronic device using Aktiv Chemistry. You **must attend class** in order to do Aktiv Chemistry work for credit. Answers to Aktiv questions submitted on paper will **not** be accepted. Grades for Aktiv Chemistry questions will be assigned based on 80 % for participation, and the remaining 20 % for answering correctly. If you miss class for a **valid** reason (it must be an institutional excuse or documented illness) and inform the instructor, the assignments done in that class can be reopened for you to complete on your own time. Otherwise, if you forget your device or miss class, the points cannot be made up, but your **three days with the lowest participation scores will be dropped.**
Atomi the participation points for another student who is not in class is cheating. If you are caught doing Aktiv Chemistry work for another student, or helping a student to obtain credit for Aktiv Chemistry work done outside of class, you both will receive a 0% for your participation grade for the entire semester. If you are caught cheating a second time, you will receive an “F” for the course.

Pre-lecture Assignments: Before most class meetings, one or more sections of the textbook and an online lecture will be assigned to watch asynchronously, and there will be a short quiz on the material due on Achieve by 10:00 am the day of each class. These are time-sensitive activities intended to prepare you for class, so they may not be taken late – no exceptions (please don’t ask for an extension. It will not be given!). But to make up for occasional missed assignments, a bonus of 5 points will be added to your pre-lecture activity percentage at the end of the semester, up to a maximum total score of 100%.

Homework: Success in this class requires skill at problem solving. For this reason, online homework will be assigned each week through the Achieve system. Homework will generally be due on Thursday nights. There will be two types of homework assignments: Learning Curve adaptive assignments and “traditional” problem sets. The points will be set to make the total number of points for homework the same each week. You must reach the target score on each Learning Curve assignment by the deadline in order to receive credit for it, otherwise you will receive a zero (the system gives no partial credit). The other homework assignments are intended to deepen your understanding of the material. These questions allow multiple attempts, with small penalties for wrong answers. Please make use of the available hints and feedback – there is no deduction for using them! Homework questions may be submitted after the deadline, but they will be subject to a late penalty of 10% per day that they are late. In calculating your final grade, the week with your lowest homework score of the semester will be dropped.

Online Quizzes: There will be online quizzes each week, except the weeks when there is an exam. Each quiz is intended to test the material from the most recent homework assignment. There will be no hints or feedback given. After you open a quiz, there will be a time limit to complete it. When you finish the quiz, your results will be shown and you will be given the option to re-take the quiz twice (up to three attempts in total). Your highest score will be counted. Quizzes will generally be due Friday nights. Plan ahead! If you know that you will be busy at the deadline, take the quiz early. If you do not complete a quiz by Friday night, there will be a two-day grace period until Sunday night. No extensions will be given after that! Your lowest quiz score of the semester will be dropped, and the percentages of the remaining quizzes averaged for your final grade.

Homework Notebook: It is strongly suggested that you keep a homework notebook for this class, in which solutions to all homework problems are neatly and logically recorded. This will help you in your studying since you will be able to review the steps that you followed in solving a problem. When you attend an SI session, or an office hour, please bring your homework notebook.

In-Class Exams: Three 50-minute exams will be given in class, on the dates shown on the schedule. Each exam will concentrate on the material covered since the previous exam. The format of the exams will include multiple choice, short answer questions and calculations. The final exam will be comprehensive and all multiple choice. It must be taken at the scheduled time (10:00 a.m. to 12:00 noon, Tuesday, December 12th).

If you have to miss an exam due to a documented medical reason or institutional excuse, you may be able to make up the exam if it can be taken before the exams are passed back to the rest of class (see make-up policy below). If the test cannot be made up in a timely manner, then the average of your other two exams will be counted as your score for the missed test.

Students may be assigned seats for the exams. In addition, you may be asked to change your seat during an exam for Academic Integrity reasons. Failure to sit in the seat assigned to you will result in your exam not being graded and you will receive a score of zero for the exam.

ACS Exam: The General Chemistry I Paired Question Exam, a standardized test from the American Chemical Society, will be given in class on Wednesday November 22nd. Taking this test is optional, but you will receive extra credit points towards your grade for each question answered correctly. There may be a make-up session offered outside of class for students who cannot take the exam on November 22nd – details will be announced later. You must take the exam at one of these two times to earn the extra credit.
Survey: This course is taking part in a research study regarding the experiences of students and instructors in General Chemistry I courses. As a part of this project, we are seeking student volunteers to complete a survey so that we may improve the success of future General Chemistry I students. Your responses on this anonymous survey may inform future program design decisions at NAU, and potentially influence product design, decision-making, and policy at other institutions nationwide. You will be eligible to receive a small amount of extra credit for completing the survey, which will be given in early November.

Communication: Check Canvas and the class webpage OFTEN for announcements and class handouts. Email is the best way to contact me (antony.hascall@nau.edu). Do NOT use the messages feature on Canvas to contact me. Use your NAU email account. Please include in your messages a subject indicating a subject indicating your section of CHM 151, an appropriate salutation, grammatically acceptable text, and a closing. Messages lacking these elements may be ignored! Please be aware that I am not allowed to discuss grades by email. I will sometimes send important announcements by email to the whole class, so please check your NAU email account frequently.

Internet / Phone Policy: Students will NOT use phones, laptops, etc., in class for non-course related activities. All devices will be kept SILENT. Research in CHM 151 & 152 (and other courses) clearly shows a negative link between in-class cell phone use and course grade. Texting and driving kills and yet people still do it! Please, help us help you be successful in this course and turn your phone OFF and put it away!

Academic Integrity: The university’s academic integrity policy will be followed (https://policy.nau.edu/policy/policy.aspx?num=100601). If you are caught plagiarizing and/or cheating on an assignment, you will receive 0 % for that assignment. If you are caught cheating a second time, or are caught cheating on the final exam, you will receive an “F” for the entire course. Examples of cheating include, but are not limited to, copying another student’s exam, using any unauthorized material to help answer test questions or attempting to receive participation credit for a class you did not attend. All violations of academic integrity will be documented with the university.

Having a cellphone, smart watch or any other web-enabled device on your person during an exam will be considered a violation of academic integrity and will result in a score of zero for that exam.

Learning Portfolio: Students are strongly encouraged to retain their exams and other work as evidence that they developed skills in scientific inquiry, critical thinking and quantitative analysis. Additionally, keeping your old work provides a record in case of errors in grade recording!

No make-ups will be given for missed quizzes or exams (except for institutional excuses). One of the complaints of students, instructors, and administrators concerning university education is that it lacks relevance. One of the relevant features of chemical information is that it is often “timed.” That is, if it is late or missing, it is worthless. Therefore, missed quizzes and exams count as zeroes. Documentable illnesses/emergency will be considered on an individual basis. Emergencies must be documented by the Office of the Dean of Students, who will issue notifications for inpatient hospitalization, death in the immediate family, or another serious personal crisis. Remember, the absence must be documentable. If you have an institutional excuse or other valid reason, contact the instructor in advance to arrange how the missed test will be made up. If the instructor was not notified in advance, a zero will be recorded. Please note that routine medical or dental appointments are NOT an acceptable reason for missing an exam.

The information contained in this syllabus, other than this course's grade and attendance policies, may be subject to change with reasonable advance notice.
**Class Schedule:** Note the important dates given here. Please see the class webpage (http://jan.ucc.nau.edu/~ah476/CHM151Schedule.html) for a more detailed schedule including planned topics to be covered each class. Any changes to the schedule will be posted online at that page.

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Chapter(s) Covered*</th>
<th>Tests</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/28-9/1</td>
<td>1</td>
<td>none</td>
<td>Math Review assignment due Friday night</td>
</tr>
<tr>
<td>2</td>
<td>9/4-8</td>
<td>2,3</td>
<td>Quiz 1 due Friday</td>
<td>No class Monday; Thurs is last day to add/drop classes</td>
</tr>
<tr>
<td>3</td>
<td>9/11-15</td>
<td>3</td>
<td>Quiz 2 due Friday</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9/18-22</td>
<td>4,5</td>
<td>Quiz 3 due Friday</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9/25-29</td>
<td>5</td>
<td>Exam 1 Friday</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10/2-6</td>
<td>4-6</td>
<td>Quiz 4 due Friday</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10/9-13</td>
<td>6</td>
<td>Quiz 5 due Friday</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10/16-20</td>
<td>8</td>
<td>Quiz 6 due Friday</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>10/23-27</td>
<td>8</td>
<td>Exam 2 Friday</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10/30-11/3</td>
<td>9-10</td>
<td>Quiz 7 due Friday</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11/6-10</td>
<td>10,11</td>
<td>Quiz 8 due Friday</td>
<td>No class Friday</td>
</tr>
<tr>
<td>12</td>
<td>11/13-17</td>
<td>11,7</td>
<td>Quiz 9 due Friday</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>11/20-24</td>
<td>7</td>
<td>ACS Exam Weds</td>
<td>No class Friday</td>
</tr>
<tr>
<td>14</td>
<td>11/27-12/1</td>
<td>12</td>
<td>Exam 3 Friday</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>12/4-8</td>
<td>13</td>
<td>Quiz 10 due Sunday</td>
<td>End of Term Week (CLASS AS USUAL! i.e. there’s still homework etc…); Friday is last day to withdraw</td>
</tr>
</tbody>
</table>

* A detailed list of the topics covered is below

**Resources for Student Success**

Successful university students take advantage of services and resources designed to boost learning and achievement. NAU recommends that you begin with:

- **Supplemental Instruction:** [https://in.nau.edu/academic-success-centers/supplemental-instruction/](https://in.nau.edu/academic-success-centers/supplemental-instruction/)  
  Attendance at these course specific sessions has proven to increase grades & reduce D’s and F’s.

- **Academic Success Centers:** [https://in.nau.edu/academic-success-centers/](https://in.nau.edu/academic-success-centers/)  
  All students are encouraged to take advantage of free academic support offered by the Academic Success Centers (ASC) including individual tutoring, peer academic coaching, the math achievement program and supplemental instruction. The ASCs have two locations in the Union Fieldhouse, room 252, on north campus and in DuBois Center, room 140, on south campus. Additional academic support resources are also available through other campus partners including, the Lumberjack Math Center, the Writing Commons and Cline Library. A more complete list of campus-wide resources is available on the ASC website.

- **Guide to Student Resources:** [https://in.nau.edu/academic-affairs/guide-to-student-resources/](https://in.nau.edu/academic-affairs/guide-to-student-resources/)
  Information about various NAU student resources provided by the Office of Academic Affairs

- **F2S** [https://in.nau.edu/f2s-outreach/](https://in.nau.edu/f2s-outreach/)  
  Provides messages to keep you academically on track – when you get a message **take action**!

**Best Practices for Success:**

- Take the pre-lectures and their quizzes **seriously**. These assignments will help you learn the material and prepare you for class.
• Attend EVERY class meeting. Attendance/class participation is part of your grade. Students who attend class and participate in a meaningful manner earn much higher grades.

• We will practice peer learning in class. I will pose questions to answer using Aktiv Chemistry. Take this seriously and think thoughtfully and analytically about the problem. Form ideas and be prepared to discuss the material in a group. Contribute to and participate actively in your group.

• Come to class prepared and ready to focus on and work on the material. Do not come to class if you plan to send text messages to your friends, surf the web, talk about non-class related matters, etc.

• DO THE HOMEWORK. You cannot do well in this course if you do not do ALL the homework problems and earn at least an 80% homework average. To be most effective, work on the homework over multiple sessions. Shortly after each class, work the questions on the topics that were covered in that class. Do not wait to start an assignment just before the deadline. You will likely burn out trying to do an entire homework assignment in one sitting, and if any technical issues arise you may not be able to sort them out in time to complete your assignment.

• Review your lecture notes shortly after class.

• Form a study group. Working in groups outside of class on homework and other material is encouraged.

• Read the text as assigned.

• Work the example and practice problems from the text as assigned in the pre-lecture assignments.

• Attend Supplemental Instruction (SI) sessions.

• Attend a Recitation section for the course.

• Attend help sessions/office hours as needed.

• Prior to the exams, complete (i.e. WORK & ANSWER EACH QUESTION) “practice” exams posted in Canvas, and additional practice problems posted on Aktiv Chemistry.

• Realize that we are all in this endeavor together. Be respectful towards the instructor, the peer assistants, and your fellow classmates. Help your classmates succeed in this course because teaching them improves your understanding. Do not do anything in or out of class that detracts from you or your classmates learning experience.

• Take advantage of the many class resources that are available to you.

• Strive to develop a true love of learning.

• STUDY, STUDY, STUDY (this means work problems, NOT just reading notes) on a regular basis throughout the semester. Do NOT take a break from this course!

Course Purpose
CHM 151 is the first semester of a 1-year sequence appropriate for pre-professional science and engineering majors. As a liberal studies course, CHM 151 provides a foundation in chemistry – the science of change. The course addresses the following liberal study themes and essential skills:

Themes:

Environmental Consciousness. Chemical change is of key importance in understanding the behavior of the Earth’s hydrosphere and atmosphere. The chemical and physical properties of gases, liquids and solids are presented in CHM 151. The student learns to name chemical compounds, recognize periodic trends of the elements and predict the product of chemical reactions. With this background, students can begin to interpret the physical and chemical processes of the natural world. Topics that illustrate these processes include aqueous reactions (critical for understanding water quality) and combustion processes (critical for understanding heat release to the atmosphere). Students will learn to associate these processes with their effect on the environment.

Technology and its Impact. Chemistry has a profound impact on the technological developments of the 20th and 21st centuries. Many chemical discoveries have improved the quality of life (drugs, laser technologies and the semiconductor industry) while others have threatened it (CFCs and pesticides). Whenever possible, this course will illustrate how modern technology has been influenced by the fundamental science taught in CHM 151.
**Essential Skills:**

**Scientific Inquiry:** Chemistry is an empirical science. What is taught in CHM 151 represents knowledge that has been acquired over the past 3 centuries through application of the scientific method, a systematic approach to research. Scientific theories will be examined in light of this process, which includes the formulation of a hypothesis, observations, symbolic representation of data, interpretation and conclusions.

**Quantitative Analysis:** Quantitative Analysis is at the root of the physical sciences. Specific skills the student will learn include writing and balancing chemical equations, dimensional analysis, and the application of algebra in the quantification of chemical change.

**Critical Thinking:** Successful chemical problem solving requires the ability to follow a logical, sequential thought process, understand abstract and symbolic language, discriminate between relevant and superfluous data and question underlying assumptions about cause and effect relationships.

**Course Outcomes (linked to theme and skills)**

Following successful completion of this course, students will be able to:

1. Distinguish between chemical and physical processes (Critical Thinking, Scientific Inquiry)
2. Utilize mathematical skills to solve chemical problems in mass relationships and stoichiometry (Quantitative Analysis)
3. Determine the solubility, concentrations and ionic properties of compounds dissolved in aqueous solutions (Quantitative Analysis)
4. Use standardized symbols to represent atoms, molecules, ions and chemical reactions (Scientific Inquiry)
5. Describe intermolecular forces which influence the properties of gases, liquids and solids (Critical Thinking, Quantitative Analysis)
6. Predict atomic structure, chemical bonding or molecular geometry based on theoretical models and results of empirical studies (Critical Thinking, Scientific Inquiry)
7. Apply chemical principles to the understanding of the physical and natural world (Critical Thinking, Scientific Inquiry)
8. Recognize the influence of chemical change in environmental situations and its impact on technology (Environmental Consciousness/Technology and its Impact)

**Assessment of Outcomes (linked to themes and skills)**

Student learning outcomes will be evaluated using examinations, quizzes and/or homework. These evaluation methods will test the student’s knowledge of scientific principles, their ability to identify and solve problems, and their ability to analyze scientific data. Quiz and exam questions will require students to:

2. Analyze data presented in graphs or tables, theoretical models, or results from empirical studies to draw correct hypotheses or conclusions (Scientific Inquiry, Critical Thinking)
3. Perform multi-step calculations using appropriate equations and formulas (Quantitative Analysis, Critical Thinking)
4. Identify proper symbolic representation of atoms, molecules, ions and chemical reactions (Scientific Inquiry)
5. Determine the products and heat exchange of chemical reactions (Quantitative Analysis, Critical Thinking)
6. Based on the physical properties of gases, liquids and solids deduce the nature of the underlying intermolecular forces (Critical Thinking, Scientific Inquiry)
7. Apply your knowledge to the chemistry of the natural world/environment. Exams, quizzes and/or homework will include questions that link acquired chemical knowledge to environmental scenarios (e.g. the ion concentration of a lake, the heat released by burning fossil fuels, or the moles of CFCs in the atmosphere) (Environmental Consciousness/Technology and its Impact)
CHM 151 Lecture Topics

We will cover most of the topics in Chapters 1–13 of the Interactive General Chemistry textbook:

I. Introduction & Atomic Structure
   Ch. 1: Measurement, and Problem Solving    Atoms and Molecules, Classification of Matter, Physical and Chemical Changes, Units and Reliability of Measurements, Problem Solving for Chemistry.
   Ch. 2: Atoms and the Periodic Table    Atomic Theory, Early Experiments, Structure of the Atom, The Periodic Table, Atomic Mass

II. Chemical Reactions & Stoichiometry
   Ch. 3: Compounds and the Mole    Chemical Bonds, Chemical Formulas and Molecular Models, Elements and Compounds, Naming Compounds and Writing Formulas – Ionic and Molecular, Molar Mass, The Mole Concept (grams to moles to atoms), Molar mass of a compound, Converting from Grams to Moles to Molecules, Percent Composition, Determining Empirical and Molecular Formulas.
   Ch. 4: Chemical Reactions and Aqueous Solutions    Writing and Balancing Chemical Equations, Electrolytes/Nonelectrolytes, Solubility, Precipitation Reactions, Writing Chemical Equations – Molecular, Ionic, Net Ionic, Acid-Base Reactions, Oxidation-Reduction Reactions.
   Ch. 5: Stoichiometry    Amounts of Products and Reactants (Stoichiometry), Limiting Reagent, Theoretical Yield, Percent Yield, Molarity, Dilutions, Solution Stoichiometry, Titrations.

III. Electronic Structure and Periodic Properties

IV. Chemical Bonding
   Ch. 10: Covalent Bonding    Types of Chemical Bonds, Lewis Dot Symbols, Lewis Structures, Resonance, Formal Charge, Exceptions to the Octet Rule, Electronegativity and Bond Polarity, Bond Energies and Bond Lengths.
   Ch. 11: Molecular Shape and Bonding Theories    VSEPR, Molecular Shapes, Polar and Nonpolar Molecules, Valence Bond Theory, Hybridization of Atomic Orbitals, Hybridization in Molecules Containing Double and Triple Bonds, Delocalized Electrons.

V. States & Properties of Pure Matter

VI. Solutions
   Ch. 13: Solutions    Types of Solutions, Energetics of Solution Formation, Factors Affecting Solubility, Concentration Units, Colligative Properties, Freezing Point Depression, Boiling Point Elevation, Osmotic Pressure, Colligative Properties of Electrolytes.

University Policies
The following pages contain statements of current (as of August 17th, 2023) NAU syllabus policies.
SYLLABUS
Requirements

Syllabus Policy Statements

Academic Integrity
NAU expects every student to firmly adhere to a strong ethical code of academic integrity in all their scholarly pursuits. The primary attributes of academic integrity are honesty, trustworthiness, fairness, and responsibility. As a student, you are expected to submit original work while giving proper credit to other people’s ideas or contributions. Acting with academic integrity means completing your assignments independently while truthfully acknowledging all sources of information, or collaboration with others when appropriate. When you submit your work, you are implicitly declaring that the work is your own. Academic integrity is expected not only during formal coursework, but in all your relationships or interactions that are connected to the educational enterprise. All forms of academic deceit such as plagiarism, cheating, collusion, falsification or fabrication of results or records, permitting your work to be submitted by another, or inappropriately recycling your own work from one class to another, constitute academic misconduct that may result in serious disciplinary consequences. All students and faculty members are responsible for reporting suspected instances of academic misconduct. All students are encouraged to complete NAU’s online academic integrity workshop available in the E-Learning Center and should review the full Academic Integrity policy available at https://policy.nau.edu/policy/policy.aspx?num=100601.

Copyright Infringement
All lectures and course materials, including but not limited to exams, quizzes, study outlines, and similar materials are protected by copyright. These materials may not be shared, uploaded, distributed, reproduced, or publicly displayed without the express written permission of NAU. Sharing materials on websites such as Course Hero, Chegg, or related websites is considered copyright infringement subject to United States Copyright Law and a violation of NAU Student Code of Conduct. For additional information on ABOR policies relating to course materials, please refer to ABOR Policy 6-908 A(2)(5).

Course Time Commitment
Pursuant to Arizona Board of Regents guidance (ABOR Policy 2-224, Academic Credit), each unit of credit requires a minimum of 45 hours of work by students, including but not limited to, class time, preparation, homework, and studying. For example, for a 3-credit course a student should expect to work at least 8.5 hours per week in a 16-week session and a minimum of 33 hours per week for a 3-credit course in a 4-week session.

Disruptive Behavior
Membership in NAU’s academic community entails a special obligation to maintain class environments that are conducive to learning, whether instruction is taking place in the classroom, a laboratory or clinical setting, during course-related fieldwork, or online. Students have the obligation to engage in the educational process in a manner that does not interfere with normal class activities or violate the rights of others. Instructors have the authority and responsibility to address disruptive behavior that interferes with student learning, which can include the involuntary withdrawal of a student from a course with a grade of “W”. For additional information, see NAU’s Disruptive Behavior in an Instructional Setting policy at https://nau.edu/university-policy-library/disruptive-behavior.

Nondiscrimination and Anti-Harassment
NAU prohibits discrimination and harassment based on sex, gender, gender identity, race, color, age, national origin, religion, sexual orientation, disability, veteran status and genetic information. Certain consensual amorous or sexual relationships between faculty and students are also prohibited as set forth in the Consensual Romantic and Sexual Relationships policy. The Equity and Access Office (EAO) responds to complaints regarding discrimination and harassment that fall under NAU’s Nondiscrimination and Anti-Harassment policy. EAO also assists with religious accommodations. For additional information about nondiscrimination or anti-harassment or to file a complaint, contact EAO located in Old Main (building 10), Room 113, PO Box 4083, Flagstaff, AZ 86011, or by phone at 928-523-3312 (TTY: 928-523-1006), fax at 928-
TITLE IX
Title IX of the Education Amendments of 1972, as amended, protects individuals from discrimination based on sex in any educational program or activity operated by recipients of federal financial assistance. In accordance with Title IX, Northern Arizona University prohibits discrimination based on sex or gender in all its programs or activities. Sex discrimination includes sexual harassment, sexual assault, relationship violence, and stalking. NAU does not discriminate on the basis of sex in the education programs or activities that it operates, including in admission and employment. NAU is committed to providing an environment free from discrimination based on sex or gender and provides a number of supportive measures that assist students, faculty, and staff.

One may direct inquiries concerning the application of Title IX to either or both the Title IX Coordinator or the U.S. Department of Education, Assistant Secretary, Office of Civil Rights. You may contact the Title IX Coordinator in the Office for the Resolution of Sexual Misconduct by phone at 928-523-5434, by fax at 928-523-0640, or by email at titleix@nau.edu. In furtherance of its Title IX obligations, NAU promptly will investigate or equitably resolve all reports of sex or gender-based discrimination, harassment, or sexual misconduct and will eliminate any hostile environment as defined by law. The Office for the Resolution of Sexual Misconduct (ORSM): Title IX Institutional Compliance, Prevention & Response addresses matters that fall under the university’s Sexual Misconduct policy. Additional important information and related resources, including how to request immediate help or confidential support following an act of sexual violence, is available at https://in.nau.edu/title-ix.

ACCESSIBILITY
Professional disability specialists are available at Disability Resources to facilitate a range of academic support services and accommodations for students with disabilities. If you have a documented disability, you can request assistance by contacting Disability Resources at 928-523-8773 (voice), 928-523-8747 (fax), or dr@nau.edu (e-mail). Once eligibility has been determined, students register with Disability Resources every semester to activate their approved accommodations. Although a student may request an accommodation at any time, it is best to initiate the application process at least four weeks before a student wishes to receive an accommodation. Students may begin the accommodation process by submitting a self-identification form online at https://nau.edu/disability-resources/student-eligibility-process or by contacting Disability Resources. The Director of Disability Resources, Jamie Axelrod, serves as NAU’s Americans with Disabilities Act Coordinator and Section 504 Compliance Officer. He can be reached at jamie.axelrod@nau.edu.

RESPONSIBLE CONDUCT OF RESEARCH
Students who engage in research at NAU must receive appropriate Responsible Conduct of Research (RCR) training. This instruction is designed to help ensure proper awareness and application of well-established professional norms and ethical principles related to the performance of all scientific research activities. More information regarding RCR training is available at https://nau.edu/research/compliance/research-integrity.

MISCONDUCT IN RESEARCH
As noted, NAU expects every student to firmly adhere to a strong code of academic integrity in all their scholarly pursuits. This includes avoiding fabrication, falsification, or plagiarism when conducting research or reporting research results. Engaging in research misconduct may result in serious disciplinary consequences. Students must also report any suspected or actual instances of research misconduct of which they become aware. Allegations of research misconduct should be reported to your instructor or the University’s Research Integrity Officer, Dr. David Faguy, who can be reached at david.faguy@nau.edu or 928-523-6117. More information about misconduct in research is available at https://nau.edu/university-policy-library/misconduct-in-research.

SENSITIVE COURSE MATERIALS
University education aims to expand student understanding and awareness. Thus, it necessarily involves engagement with a wide range of information, ideas, and creative representations. In their college studies, students can expect to encounter and to critically appraise materials that may differ from and perhaps challenge familiar understandings, ideas, and beliefs. Students are encouraged to discuss these matters with faculty.

Last revised August 4, 2022