

**CHEMISTRY 1420-002: General Chemistry II for Science Majors**

Fall 2025

**Class:** MWF 1:00 – 1:50 PM in CHEM 106

**Recitation:** W 2:00 – 2:50 PM in CHEM 106

**Course Information:**

***Instructor Information:***

**Your Instructor:** Mary Tess Urbanek (pronouns: She/her/hers)

**Office Location:** Chemistry 115

**Email:** MaryTessUrbanek@my.unt.edu, *please include CHEM1420 in subject line.* I am usually pretty responsive with student emails, but sometimes things slip through. If you do not get a response within 2 business days, please send a follow-up!

**Student Drop-In Hours:** Tuesdays and Thursdays from 10 AM to noon in CHEM115. If these drop-in hours do not work with your schedule, please feel free to email me to set up an appointment.

*I encourage you to come by drop-in hours at least once this semester. You don’t need to have a specific question or anything, but coming by helps me put names to faces. If you don’t have a specific question but would like to work on the material more with someone, drop-in hours are a great option!*

**My Values:** As a chemistry education researcher, I value the resources and experiences that you bring to the classroom that shape your learning. I care about the success of each of my students and believe that all of you can succeed in learning chemistry. That means when challenges do arise, I believe that you can overcome them, and I want to support you in doing so. When questions come up in the course, I encourage you to start by contacting me directly so that I can support your learning to the best of my ability.

***Course Description:*** The goal of this course is to further your understanding of the fundamentals of matter. Topics covered in this course include solutions, thermodynamics, chemical kinetics, chemical equilibrium, acid-base chemistry, electrochemistry, radioactivity, and nuclear chemistry. By the end of this course, you should be able to:

(1) apply quantitative skills to reason about a chemical systems’ thermodynamic, kinetic, equilibrium, and electrochemical properties

(2) leverage solubility, thermodynamic, kinetic, equilibrium, and electrochemical data to draw conclusions about chemical systems

(3) conceptually explain and mathematically model acid-base reactions and systems

(4) characterize the parts of an atom and how atoms can degrade

*Course Prerequisites or Other Restrictions:* C or better in CHEM1410 or CHEM1413

*Note*: This is the lecture component for General Chemistry II and is a separate course from the laboratory. Students must be registered for CHEM1440 to participate in the laboratory component of this course.

*Important Note:* Students enrolling in CHEM1420 are accountable for the material that was covered in CHEM1410. If you have not mastered those concepts, please visit with me or a TA so that we can provide the resources to help you learn and review the material so that you are prepared for this course.

***Course Materials:***

**Textbook:** The textbook we use for this course is *Chemistry: Atoms First 2e*. It is a FREE textbook and can be accessed via our Canvas course or through this link: <https://openstax.org/details/books/chemistry-atoms-first-2e>.

**Calculator:** You will need a calculator for this course. Cellphones are *not* permitted to be used as calculators, especially on exams.Any calculator is allowed besides those that can connect to the Internet, such as TI-Nspire.

All other course material, such as iClicker, can be accessed through our Canvas page.

**Course Requirements:**

***Point Allocation:*** There are a total of 1000 points available for the course. Please see below for a detailed breakdown:

|  |  |
| --- | --- |
| **Assignment** | **Points Allocated** |
| Homework | 100 points |
| Pre-Class Assignments | 100 points |
| Recitation | 100 points |
| Concept Map | 50 points |
| Quizzes | 100 points |
| In-Class Participation | 50 points |
| Top 3 Unit Exams | 300 points |
| Final Exam | 200 points |

***Grading Scheme:***This class uses a standard grading schematic. Please see below for a detailed breakdown:

|  |  |  |
| --- | --- | --- |
| **Points Earned** | **Percent Points Earned** | **Letter Grade** |
| 900 – 1000 | 90 – 100% | A |
| 800 – 899 | 80 – 89% | B |
| 700 – 799 | 70 – 79% | C |
| 600 – 699 | 60 – 69% | D |
| 0 – 599 | 0 – 60% | F |

Extra Credit may be offered at the discretion of the professor. No extra credit or additional assignments are available after the final exam.

***Course Policies:***

**Homework Assignments (100 pts.):** The point of these assignments is for you to get more practice and solidify the content that we covered that week in class. These will be due almost every week at 11:59 PM on Sunday and are worth 10 points each. There will be no homework assignments during exam weeks. Homework will be posted on Canvas at the beginning of the week on Monday. These will be Word documents that you can download and fill in or upload a photo of your handwritten responses. Please make sure your handwriting is legible, otherwise we will not be able to give you credit for your work.

**Pre-Class Assignments (100 pts.):** Throughout the semester, there will be short, 2 – 5 question Canvas quizzes available for you to complete prior to the beginning of class. These questions are intended to reinforce content originally covered in CHEM1410 or content that we covered previously in CHEM1420. They will be administered shortly before we use that content in our course again. For example, if our upcoming lecture requires you to remember how to solve for ∆H, your pre-class assignment will have a few questions over it. Each of these assignments will have five attempts.

**Recitation (100 pts.):** During our scheduled recitation times, we will be conducting active problem-solving sessions where you can get lots of help from your peers, your TA, your PLTL, and myself. The expectation is that you will work constructively with your pre-assigned small groups to complete a problem set, which will be submitted to document your attendance. These problem sets are meant for you to practice and ask questions. If you are actively participating during these sessions, you will receive all points. Each recitation is worth 10 points, and you can earn up to 100 points. This means you have one unexcused absence from recitation for the semester. I understand that things will come up this semester that may cause you to miss recitation. Please communicate with me directly so that we can find alternative ways for you to make up these points.

**Concept Map (50 pts.):** Concept maps are extremely useful for your learning, *especially* in classes like general chemistry where it can be hard to see the connections between different topics initially. But identifying these connections is really important for helping you gain a more comprehensive understanding of chemistry. We will be using concept maps to help you facilitate this type of thinking.

You can access your concept map by clicking on the “Class Notebook” page on Canvas. This should open up a OneNote notebook that is only viewable by you, me, and your TA. You may need to enter your UNT credentials. Navigate to the “Concept Map” page, and you should see a page with more specific instructions for you to follow as you draft these maps. You will be required to update your concept map at least 5 times throughout the semester: **August 29th, September 9th, October 7th, November 4th, and November 18th**. Specifics about what I will be looking for during each check will be available on the assignment on Canvas. Each check will be worth 10 points. I will go in and leave feedback on what you wrote after each check for you to consider as we move forward. As long as you complete the concept map on time and follow the instructions on Canvas and the notebook page, you will receive full credit.

**Quizzes (100 pts.):** There will be five quizzes throughout the course of the semester, each one worth 20 points. They will open the Friday before each exam and will be due before the beginning of your Wednesday exam. All quizzes will be taken on Canvas. These quizzes are meant to give you the opportunity to test your learning before you take your examination. The questions will be representative of the content that will be covered on the following examination. Each quiz will have five attempts.

**In-Class Participation (50 pts.):** Throughout the course of the semester, we will be utilizing iClicker to answer questions in class. To answer the questions, you’ll need to sign up for iClicker using the instructions posted on Canvas. You should **NOT** need to purchase a subscription as a UNT student. Points for these will be based on your engagement, not correctness. You’ll need to answer at least 80% of the total questions throughout the semester to receive all 50 points.

**Unit Exams (100 pts. each, 300 pts. total):** There will be four unit exams throughout the course of the semester. We will take these during our Wednesday class periods, and there will be no recitation these days. That means you can use both lecture and recitation time to complete your exams (2 hours total). These exams will be completed on paper. You can use a pencil and your calculator, but no other material or resources. I will provide you with a periodic table and extra scratch paper should you need it. Your lowest unit exam will be dropped at the end of the semester. *Please note that you are still responsible for the content on your dropped exam, as it will still appear on your final exam and your future courses!*

**Final Exam (200 pts.):** This is a required, comprehensive exam that will take place on **Saturday, December 6th, 2025** at **10:30 AM.** The exam is 2 hours in length. *It does* ***NOT*** *count towards one of your dropped exams!*

**Late Work Policy:** I completely understand that things will come up this semester that may influence your ability to complete assignments on time. Please communicate with me directly if something like this comes up, so we can come up with a plan to keep you on track. In the past, I’ve allowed students to submit an assignment late with a small late penalty (10%) as long as they’ve communicated with me and submitted their work within a week of the original deadline.

There are several policies already built into the course to help maintain flexibility (i.e. a dropped exam, missed recitations, etc.). I do not accept late exams. If you will be missing an exam, or any other assignment, due to a UNT-approved absence, please contact me so we can set up an alternative assignment for you.

**Attendance Policy:** Research has shown that students who attend class are more likely to be successful in the course. Additionally, a portion of your grade is determined by you coming to class and participating. You should attend every class unless you have a university excused absence, such as active military service, a religious holy day, or an official university function as stated in the [Student Attendance and Authorized Absences Policy (PDF)](https://policy.unt.edu/policy/06-039) (https://policy.unt.edu/policy/06-039). If you cannot attend class due to an emergency, please let me know. Your safety and well-being are important to me.

**Course Conduct:** I am committed to creating a learning environment where diverse perspectives are recognized and valued as a source of strength. I request that all students work with me to create a welcoming class culture based on open communication, mutual respect, and inclusion. As a class we will approach all discussion with respect and civility. Disagreements and debates in academic discourse are expected and welcome, but personal attacks are never okay, and will ***not*** be tolerated. I strive to ensure an open and welcoming classroom for all students. If I ever miss the mark, please don’t hesitate to come and talk to me. We are all learning together.

**Course Schedule\*:**

|  |  |  |
| --- | --- | --- |
| **Date** | **Content Covered** | **Textbook Sections** |
| August 18 | Introduction/Syllabus Overview |  |
| August 20  | Aqueous Solution Review (1410), Introduction to Solutions | 6.3 – 6.4, 11.1 – 11.3 |
| August 22 | Intermolecular Force Review (1410), Colligative Properties | 10.1, 11.3 - 11.4 |
| August 25 | Colligative Properties | 11.4 |
| August 27  | Thermochemistry Review (1410) & Entropy | 9.3, 12.2 |
| August 29 | Entropy & 2nd/3rd Laws of Thermodynamics | 12.2 – 12.3 |
| September 1 | **Labor Day – No Class** |  |
| September 3  | Spontaneity & Gibbs Free Energy  | 12.1, 12.4 |
| September 5 | Gibbs Free Energy | 12.1, 12.4 |
| September 8 | Wrap up Thermodynamics | 12.1 – 12.4 |
| **September 10** | **EXAM ONE: Thermodynamics and Solutions** |  |
| September 12 | Introduction to Chemical Kinetics, Relative Rates | 17.1 |
| September 15 | Rate Laws and Reaction Orders | 17.3 |
| September 17 | Integrated Rate Laws | 17.4 |
| September 19 | Collision Theory, Factors Affecting Rates, Arrhenius Equation | 17.2, 17.5 |
| September 22 | Reaction Mechanisms | 17.6 |
| September 24 | Wrap up Chemical Kinetics | 17.1 - 17.6 |
| September 26 | Introduction to Dynamic Chemical Equilibrium | 13.1 – 13.2 |
| September 29 | Chemical Equilibrium – ICE Tables | 13.4 |
| October 1 | Reaction Quotients, Le Chatelier’s Principle | 13.3 |
| October 3 | Temperature Dependence of Equilibrium | 13.4 |
| October 6 | Wrap up Chemical Equilibrium | 13.1 – 13.4 |
| **October 8** | **EXAM TWO: Chemical Kinetics & Equilibrium** |  |
| October 10 | Introduction to Acid-Base Chemistry | 7.2, 14.1 |
| October 13 | pH and pOH Calculations of Strong Species | 14.2 |
| October 15 | Weak Acids and Bases, Polyprotic Species | 14.3, 14.4 |
| October 17 | Calculations Involving Weak Acid-Base Species | 14.3, 14.4 |
| October 20 | Lewis Acids and Bases | 15.2 |
| October 22 | Titrations | 14.7 |
| October 24 | Titrations | 14.7 |
| October 27 | Buffers | 14.6 |
| October 29 | Buffers | 14.6 |
| October 31 | Ksp | 15.1 |
| November 3 | Wrap up Acid-Base Chemistry and Ksp  | 14.1 – 15.1 |
| **November 5** | **EXAM THREE: Acid-Base Chemistry and Ksp** |  |
| November 7 | REDOX Review (1410), Introduction to Electrochemistry | 4.2, 16.1 |
| November 10 | Galvanic Cells and Cell Potentials | 16.2 – 16.3 |
| November 12 | Equilibrium, Cell Potentials, and Free Energy & Batteries | 16.4 – 16.5 |
| November 14 | Nuclear Chemistry | 20.1 – 20.2 |
| November 17 | Nuclear Chemistry | 20.3 |
| **November 19** | **EXAM FOUR: Electrochemistry and Nuclear Chemistry** |  |
| November 21 | Wrap up any Nuclear Chemistry material | 20.1 – 20.3  |
| November 24 | **Thanksgiving – No Class** |  |
| November 26 | **Thanksgiving – No Class** |  |
| November 28 | **Thanksgiving – No Class** |  |
| December 1 | Organic Chemistry Prep Day |  |
| December 3 | Final Exam Review Day |  |
| December 5 | **Reading Day – No Class** |  |

\*Subject to change.

**Being Successful in This Course:**

UNT strives to offer you a high-quality education and a supportive environment, so you learn and grow. As a member of this community, I am committed to helping you be successful as a student, both inside and outside my classroom. There will be times in this course that you will be challenged, but there are so many resources to help you persist through these challenges:

1. If you have questions, I should be one of your first resources for getting help. Please come see me during my drop-in hours, or schedule an appointment to meet with me one-on-one.
2. Reach out to me or your TA for help early! If something doesn’t make sense, ask for clarification or help right away. This class naturally builds off itself, so getting help early will help keep you on track to be successful!
3. There is a chemistry resource room (CHEM 231) where you can go for help. This is a great space to visit if you need help but your TA or I am unavailable! You can also visit [The Learning Center](https://learningcenter.unt.edu/) on campus for free personal tutoring or academic coaching.
4. Attend PLTL sessions! This is a great space for you to get your questions answer or get more practice with the material in a really low-stakes way (and I’m offering extra credit for attending them!). Please check Canvas for a list of when your PLTL sessions are.
5. Give this class an honest go! Trying something, even if you don’t get it right the first time. This helps me figure out where you are so I can better tailor my instruction to you!
6. The best way to be successful in this course is to keep practicing. I will provide several opportunities both inside and outside the classroom for you to utilize. I would highly recommend using this practice as an opportunity to figure out what you know and still need to work on, and then come see me or your TA to get more help.

I care deeply about the success of each of my students. Please come talk to me if you have any questions or concerns about the course. I encourage you to be honest with yourself, your peers, and your instructional team. Think about what you know and can do, and what things you still need to learn. This honesty and communication makes my instruction far more beneficial for you!

To learn more about campus resources and information about how you can be successful at UNT, go to [unt.edu/success](http://unt.edu/success) and explore [unt.edu/wellness](http://unt.edu/wellness). To get all your enrollment and student financial-related questions, go to [scrappysays.unt.edu](http://scrappysays.unt.edu/).

***Generative AI:***

Throughout the semester, you may use specific Generative AI (GenAI) tools for certain assignments, with guidance on responsible use. These assignments help build ethical resilience and GenAI literacy, preparing you for careers in a GenAI-oriented workforce. If you use GenAI to complete assignments in this course, such as your homeworks, I strongly encourage you to do so *responsibly*. This means asking GenAI for example problems for you to try and solve, or asking specific questions when I or a TA is unavailable to help you. It is ***not*** permitted for you to have GenAI as a substitute for your own work. Additionally, it’s important to note that GenAI is ***not*** permitted on your examinations or your concept maps. Please keep this in mind if/when you use GenAI in this course. I would also encourage you to note that as your instructor, I want to know what ***you*** know so that I can tailor my examinations, assignments, instruction, etc. appropriately. Using GenAI to complete your work takes away my ability as your instructor do this.

If you use GenAI on an assignment, you ***must*** disclose this to me by noting what questions you used it on and how you were using it (i.e. to clarify a specific term, show you example problems, etc.). In accordance with the UNT Honor Code, unauthorized use of GenAI tools is prohibited. Using GenAI content without proper credit or substituting your own work with GenAI undermines the learning process and violates academic integrity. If you’re unsure whether something is allowed, please seek clarification.

**UNT Policies:**

***Academic Integrity Policy:***

According to UNT Policy 06.003,Student Academic Integrity, academic dishonesty occurs when students engage inbehaviors including, but not limited to cheating, fabrication, facilitating academicdishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty mayresult in a range of academic penalties or sanctions ranging from admonition toexpulsion from the University. This includes using electronic communication with otherpeople during exams, formula sheets or notes used on exams, etc.

In many cases, academic misconduct most often occurs because students become overwhelmed and desperate. If you are concerned about how you are doing in this course, please come speak with me instead of considering academic misconduct. You are very capable of meeting my expectations for this course, and I would love to help you do so.

***Accommodations:***

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodation at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encourage to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the [Office of Disability](https://studentaffairs.unt.edu/office-disability-access/) website (https://studentaffairs.unt.edu/office-disability-access/). You may also contact ODA by phone at (940) 565-4323.

My take here is that it is my job to teach you, and knowing about and following your accommodations is part of that. Please come see me as soon as possible if you have accommodations so I can ensure I’m following them appropriately!

***Emergency Notifications & Procedures:***

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

***Retention of Student Records:***

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Canvas online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about student’s records will not be divulged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University’s policy. See UNT Policy 10.10, Records Management and Retention for additional information.

***Acceptable Student Behavior:***

Student behavior that interferes with an instructor’s ability to conduct a class or other students’ opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student’s conduct violated the Code of Student Conduct. The University’s expectations for student conduct apply to all instructional forms, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT’s [Code of Student Conduct](http://deanofstudents.unt.edu/conduct) (<http://deanofstudents.unt.edu/conduct>) to learn more.

***Access to Information – Eagle Connect:***

Students’ access point for business and academic services at UNT is located at [my.unt.edu.](http://my.unt.edu/) All official communication from the University will be delivered to a student’s Eagle Connect account. For more information, please visit the [website](https://it.unt.edu/eagleconnect) that explains Eagle Connect and how to forward e-mail (<https://it.unt.edu/eagleconnect>).

***Student Evaluation Administration Dates:***

Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is a requirement for all organized classes at UNT. The survey will be made available during weeks 13, 14, and 15 of the long semesters to provide students with an opportunity to evaluate how this course is taught. Students will receive an email from “UNT SPOT Course Evaluations via IASystem Notification” (no-reply@iasystem.org) with the survey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the [SPOT website](http://spot.unt.edu/) (<http://spot.unt.edu/>) or email spot@unt.edu.

***Sexual Assault Prevention:***

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment, sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) and UNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know if experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT’s Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim’s compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both on and off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Office at 940-565-2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940)-565-2759.