

CHEMISTRY 1413 – HONORS GENERAL CHEMISTRY LECTURE

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Office Hours: 10:00 – 11:00 Monday, Wednesday and Friday, and by appointment. I am on campus from 8:00 – 5:00 Monday through Friday. I will be more than happy to answer questions anytime that I am not busy with someone else.

Textbook: Chemistry: Atoms First (5th Edition), by Burdge and Overby,
Publisher: McGraw Hill, Copyright (2024)

Catalog Description

Fundamental concepts, states of matter, periodic table, structure and bonding, stoichiometry, oxidation and reduction, solutions, and compounds of representative elements.

Course Prerequisite: MATH 1100 – College algebra

Course Objectives

- (1) Upon successful completion of Chem. 1413, students should be able to follow the rules of significant digits and express answers in both decimal and scientific notations.
- (2) Upon successful completion of Chem. 1413, students should understand the underlying concepts associated with the early and modern atomic theories and their applications to the periodic table and basic chemical reactions along with how elements combine to form different structures.
- (3) Upon successful completion of Chem. 1413, students should be able to apply the scientific method.
- (4) Upon successful completion of Chem. 1413, students should be able to name elements and compounds, understand the connections between a balanced chemical equation and mass/molar quantities, and the importance of chemistry as the central science.
- (5) Upon successful completion of Chem. 1413, students should be able to draw Lewis dot structures, determine molecular shape, bond order and hybridization.
- (6) Upon successful completion of Chem. 1413, students should be able to solve problems related to the concepts of density, heat, stoichiometric relationships, gas laws, and solubility.

Student Learning Objectives: General Chemistry (based on topics listed by the ACS Exams Institute)

1. Students will be able to apply measurements, scientific notation and significant figure rules to all algorithmic-based problems.
2. Students will be able to perform all types of elementary conversions involving temperature, distance, mass and volume.
3. Students will be able to identify and describe matter and subatomic particles of isotopes.
4. Students will be able to write and be able to determine chemical/empirical formulas for most inorganic compounds and select groups of organic compounds.
5. Students will be able to name inorganic compounds and select groups of organic compounds.
6. Students will be able to balance chemical equations and identify the major types of chemical reactions.

7. Students will be able to solve basic stoichiometry problems.
8. Students will be able to determine oxidation numbers of atoms in common compounds.
9. Students will be able to identify the components contributing to the chemistry (solubility, acids/bases, etc.) of most compounds.
10. Students will be able to calculate molar and molal concentrations of chemicals in various solutions and mixtures, and to work stoichiometric problems using afore-mentioned concentrations.
11. Students will be able to solve thermochemical equations.
12. Students will be able to write electron configurations and understand basic quantum number rules.
13. Students will be able to differentiate between ionic and covalent bonding.
14. Students will be able to explain the periodic trends including, but not limited to, atomic radius, ionization energy, electron affinity, and electronegativity
15. Students will be able to draw Lewis structures, including isomers, resonance, and determine formal charges.
16. Students will be able to apply VSEPR theory to determine the electronic and molecular shape of simple inorganic and organic compounds.
17. Student will be able to solve ideal gas law and gas stoichiometry problems.
18. Student will be able to describe common physical and chemical properties of solids, liquids, and gases.
19. Students will assess the concepts of intermolecular forces and how these forces affect the structure and properties of molecules.

TENTATIVE SCHEDULE

WEEK OF:	CHAPTERS TO BE COVERED
August 17	Chapter 1: Chemistry: The Science of Change Chapter 2: Atoms and the Periodic Table
August 24	Chapter 2: Atoms and the Periodic Table Chapter 3: Quantum Theory and the Electronic Structure of Atoms
August 31	No class on Monday Labor Day Chapter 3: Quantum Theory and the Electronic Structure of Atoms Exam over Chapters 1-3 and part of Chapter 4 on Friday
September 7	Chapter 4: Periodic Trends of the Elements Chapter 5: Ionic and Covalent Compounds
September 14	Chapter 6: Representing Molecules
September 21	Chapter 6: Representing Molecules

	Chapter 7: Molecular Geometry, Intermolecular Forces, and Bonding Theories
September 28	Chapter 7: Molecular Geometry, Intermolecular Forces, and Bonding Theories Exam over Chapters 4 - 7 on Friday
October 5	Chapter 7: Molecular Geometry, Intermolecular Forces, and Bonding Theories Chapter 8: Chemical Reactions
October 12	Chapter 8: Chemical Reactions
October 19	Chapter 8: Chemical Reactions Chapter 9: Chemical Reactions in Aqueous Solutions
October 26	Chapter 9: Chemical Reactions in Aqueous Solutions Exam over Chapters 7, 8 and part of Chapter 9 on Friday
November 2	Chapter 9: Chemical Reactions in Aqueous Solutions Chapter 10: Energy Changes in Chemical Reactions
November 9	Chapter 10: Energy Changes in Chemical Reactions Chapter 11: Gases
November 16	Chapter 11: Gases Chapter 12: Liquids and Solids Exam over Chapters 8 - 11 on Friday
November 23	Fall holiday and Thanksgiving Day break
November 30	Chapter 12: Liquid and Solids Pre-Finals Week – Review for Final Exam Reading Day – December 4– Class will not meet

Final Exam: The final exam in the course is scheduled for:

CHEM 1413.001 – Final Examination is from 8– 10 am on Monday, December 7.

As listed in the online Fall Final Exam Schedule

GRADING POLICY:

Your grade will be determined entirely by your performance on the regular 100-point examinations and a 200-point comprehensive final exam. There will be no extra credit assignments, reports, papers, etc. THERE ARE NO MAKEUP EXAMINATIONS SO IT IS IMPORTANT THAT ONE SHOW UP ON TIME FOR EVERY ONE OF THE REGULAR

EXAMINATIONS. You will be allowed to drop the lowest of the five 100-point examinations. **Examination scores of zero that result from cheating cannot be dropped.** Remember that you are allowed to drop the lowest of the four 100-point examinations. **The 200-point comprehensive final exam grade will not be dropped.**

Should you miss one or more of the 100-point examinations for an excused absence, you will be allowed to take a make-up examination. The excused absences that are listed in UNT Policy 06.039 Student Attendance and Authorized Absences are:

- a. religious holy day, including travel for that purpose;
- b. participation in an official university function;
- c. required military service, including travel for that purpose;
- d. pregnancy and parenting under Title IX; and
- e. when the University is officially closed.

Please note that the student is responsible for requesting in a reasonable time an excused absence in writing, providing satisfactory evidence to the faculty member to substantiate excused absence, and delivering the request personally to the faculty member assigned to the course for which the student will be absent.

If you miss an examination because of an un-excused absence, you will receive a grade of zero for the missed examination. Remember that you are allowed to drop the lowest examination score and the missed examination for an un-excused absence can then serve as your one dropped examination. **The 200-point comprehensive final exam grade will not be dropped.**

Should you have a question concerning the way that your examination was graded, or if you think that there was an error in calculating the exam score, then it is your responsibility to bring the matter to the attention of the Instructor in timely fashion. Except for the last 100-point exam, students have two weeks from when the examination was passed back to the class to bring up grading errors or other such concerns. On the last 100-point examination students have until the day of their Final Examination to bring up grading concerns. It is your responsibility to check your examination for grading errors, and to make sure that the score was correctly calculated.

Grades will be based upon the best three of four 100-point regular examinations and 200-point comprehensive final examination. Points will be assigned as follows:

Best three 100-point regular examinations	300 Points
200-Point Comprehensive final examination	200 Points

Letter grades will be based upon the following grading scale:

90 – 100 % of the total points	450 – 500 Points	Grade = A
80 – 89 % of the total points	400 – 449 Points	Grade = B
70 – 79 % of the total points	350 – 399 Points	Grade = C
60 – 69 % of the total points	300 – 349 Points	Grade = D
Below 60 %	0 – 299 Points	Grade = F

The University does have very strict rules concerning “Incomplete” grade. The incomplete grade is given only during the last one-fourth of a term/semester, and only if a student: (1) gives notice to the instructor of being required to participate in active military service; or (2) is passing the course and has justifiable reason why the work cannot be completed on schedule. Grades of incomplete are not to be used as a substitute for “F”. The rules governing “Incomplete” are explained in greater detail in the UNT Undergraduate Catalog.

ADA POLICY

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one’s specific course needs. Students may request accommodations at any time, however, ODA notices of 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 accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at disability.unt.edu.

PROHIBITION OF DISCRIMINATION, HARASSMENT, AND RETALIATION (POLICY 16.004)

The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate.

EMERGENCY NOTIFICATION & 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 public 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.

TEST POLICY

It is important to show up on time for the examination. The only time that one has to work the examination is the allotted class time. **No examination will be passed out once the first student has completed the examination and left the classroom.** Cell phones and cell phone calculators are not to be used during the examination. One cannot share calculators during the exam, or use (or have on their desks) any device which can connect to the internet during the exam, nor can one talk with other students during the exam. I reserve the right to relocate one or more students during the exam.

Academic dishonesty and cheating will not be tolerated. UNT's Office of General Council has required the following text to be added to all course syllabi:

Unauthorized Aids During Examinations and Assessments

Students may use only those materials and resources that are expressly authorized by the instructor for a particular examination or assessment. Touching, holding, or accessing any unauthorized aid during the examination period constitutes a violation of the Student Code of Conduct, regardless of whether the aid is used.

Any item that may be considered an unauthorized aid must be kept out of view and in a closed container (e.g. zipped backpack, buttoned purse, etc.) during the entirety of the examination or assessment.

Unless specifically authorized in writing by the instructor, prohibited aids include, but are not limited to:

- Mobile phones and smartphones
- Smartwatches and fitness trackers with communication, recording, or internet capabilities
- Tablets, laptops, and other computing devices
- Earbuds, headphones, and other audio devices
- Smart glasses, cameras, recording devices, and wearable technology
- Artificial intelligence (AI) tools, chatbots, and other generative AI technologies
- Notes, textbooks, study guides, formula sheets, or reference materials
- Any other device, material, or resource not expressly permitted by the instructor

Students are responsible for clarifying any questions about permitted materials before the examination begins.

According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. Cheating on an exam will result in either: (a) a score of zero on the exam (**this exam cannot be dropped**); or (b) dismissal from the course with an "F".

DISRUPTION OF CLASS

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 forums, including University and electronic classroom,

labs, discussion groups, field trips, etc. Visit UNT's Code of Student Conduct (<https://deanofstudents.unt.edu/conduct>) to learn more.

ATTENDANCE POLICY

Students are expected to attend classes regularly and to abide by the attendance policy established for each class. Students must follow the university's Authorized Absence Policy:

<https://policy.unt.edu/sites/default/files/06.039%20Student%20Attendance%20and%20Authorized%20Absences.pdf>

Students are responsible for the material that is covered in the class lecture and during the recitation. Should a student miss a lecture or recitation class, it is the student's responsibility to get the lecture notes from other students.

CHEMISTRY RESOURCE CENTER

The Chemistry Resource Center (CRC), located in Room 231 of the Chemistry Building, provides free tutorial instruction to students enrolled in undergraduate chemistry courses. The CRC is staffed by highly qualified chemistry graduate students. The hours of operation of the CRC will be posted on the outside of the door.

COMPUTATIONAL CHEMISTRY INSTRUCTIONAL LABORATORY

The Computational Chemistry Instructional Laboratory (CCIL), located in Room 232 of the Chemistry Building, provides computer access to all undergraduate and graduate students enrolled in UNT chemistry courses. Computers are to be used only for chemistry related work and instruction. CCIL is not a general access lab.

SUGGESTED HOMEWORK PROBLEMS

From our textbook

Chapter 1:	11, 13, 15, 17, 19, 25, 29, 31, 33, 39, 41, 45, 49, 75, 79, 83, 91, 95
Chapter 2:	15, 17, 19, 27, 29, 35, 37, 53, 55, 57, 59, 61, 73, 77
Chapter 3:	5, 7, 15, 17, 25, 27, 37, 59, 83, 89, 95, 97, 99, 101, 105, 117, 119
Chapter 4:	17, 19, 39, 45, 47, 49, 51, 55, 57, 69, 73, 75, 111, 117
Chapter 5:	7, 9, 15, 25, 27, 43, 49, 55, 57, 67, 69, 83, 85, 89, 95, 99, 119, 123, 125
Chapter 6:	9, 17, 19, 23, 29, 31, 35, 39, 49, 55, 65, 67, 69, 75, 77, 81
Chapter 7:	7, 9, 11, 13, 19, 21, 29, 33, 37, 39, 49, 55, 62, 63, 67, 69, 72, 75, 77, 79, 97, 99, 103, 109, 118, 125
Chapter 8:	7, 9, 11, 17, 19, 21, 23, 29, 49, 51, 53, 75, 85, 87
Chapter 9:	21, 23, 25, 33, 43, 45, 47, 49, 53, 55, 63, 65, 67, 69, 71, 73, 75, 77, 79, 83, 99, 105, 111, 121, 129, 149
Chapter 10:	11, 13, 16, 21, 23, 25, 31, 33, 35, 45, 47, 55, 57, 59, 63, 75, 87, 89, 95, 123, 135, 145
Chapter 11:	9, 13, 23, 25, 27, 31, 35, 43, 47, 51, 57, 85, 87, 105
Chapter 12:	12, 16, 33, 65, 69, 101

Additional suggested homework problems are listed in the in first module of the Canvas course website.

Chapter 1 (book)	=	Chapter 1 (pdf)
Chapter 2 (book)	=	Chapter 2 (pdf), the part in chapter 2 about organic nomenclature will be postponed until Chapter 5.
Chapter 3 (book)	=	Chapter 7 and Chapter 8 (pdf file)
Chapter 4 (book)	=	Chapter 7 and Chapter 8 (pdf file)
Chapter 5 (book)	=	Chapter 3 (pdf file), textbook problems 3.22, 3.27, 3.29, supplemental problems 1-4
Chapter 6 (book)	=	Chapter 9 and Chapter 10 (pdf)
Chapter 7 (book)	=	Chapter 9 and Chapter 10 (pdf)
Chapter 8 (book)	=	Chapter 3 (pdf file)
Chapter 9 (book)	=	Chapter 4 (pdf file)
Chapter 10 (book)	=	Chapter 6 (pdf file)
Chapter 11 (book)	=	Chapter 5 (pdf file)
Chapter 12 (book)	=	Chapter 12 (pdf file)