CHEM 1315 Syllabus
General Chemistry

COURSE DESCRIPTION: First of a two semester sequence in general chemistry. Topics covered: basic measurement, gas laws, and changes in state, stoichiometry, atomic theory, electron configuration, periodicity, bonding molecular structure and thermochemistry. There are online practice quizzes, with feedback, that the student can take as many times as he or she chooses. There are self-tests taken online with immediate grading. The online virtual labs and the online exams count toward the final grade. The labs are completed online at The ChemCollective by completing assigned procedures for a grade.

PREREQUISITES: MATH 1503 OR MATH 1643, OR MATH ACT EQUAL TO OR GREATER THAN 23

REQUIRED TEXTS:

RECOMMENDED TEXTS:

OTHER REQUIRED MATERIALS:
- A simple scientific calculator (with no graphing or alpha-numeric functions) is permitted.
- A Sapling Learning Account. Your quizzes will be completed here. Sign up for Sapling Learning by going to [www.saplinglearning.com](http://www.saplinglearning.com). This will be an additional fee of $34.00 paid to Sapling Learning at the time you sign up for your course on the Sapling Learning website. (Instructions for how to sign up for Sapling are listed on the content tab of your course under the heading “Sapling Sign-Up Instructions”)

COURSE STRUCTURE: Your course is comprised of the following units:
- Unit 1 = Fundamental Chemical Information, Atoms, Molecules, and Ions
- Unit 2 = Stoichiometry
- Unit 3 = Thermochemistry
- Unit 4 = Atomic Structure and periodicity
- Unit 5 = Molecular Structure and Bonding
- Unit 6 = Properties of Gases
- Unit 7 = Properties of Liquids, Solids, and Solutions
- Unit 8 = Organic Chemistry
COURSE OBJECTIVES:
As a student in this course you will:

- Classify states of matter and the physical and chemical changes that occur to matter.
- Convert units within and between unit systems utilizing different conversion methods and techniques.
- Identify and distinguish mass conversion, definite composition, multiple proportions, Dalton's Atomic Theory, and Modern Atomic Theory.
- Describe the subatomic structure of subatomic particles by determining atomic weights and using isotopic notation.
- Describe the elements and their properties by using the Periodic Table.
- Form ionic and covalent compounds.
- Use molar mass and Avogadro's number to convert various elements into different units.
- Determine percentage composition and molecular formulas from experimental analysis data.
- Write and balance chemical equations.
- Relate numbers of Moles, grams and particles in a chemical equation (including limiting reagents).
- Calculate Molarity
- Utilize and convert different forms of energy using Thermodynamics.
- Use calorimetry to and stoichiometry to measure physical and chemical energy changes.
- Interpret the line spectrum of an atom and how energy changes between electrons.
- Describe and identify the purpose and parts of the quantum mechanics model.
- Predict trends; similarities and differences of physical and chemical properties of elements using the periodic table and electron configuration.
- Identify and describe different types of bonds and how they are formed.
- Illustrate the structure of ions and molecules using the Lewis Dot Structure including the exception to the octet rule.
- Identify the different types of structures used to describe molecules including but not limited to resonance structures, Valence Shell Electron Pair Repulsion Theory (VSEPR) and the 3-d shapes of molecules.
- Predict the effect of molecular polarity on behavior and shape of a molecule.
- Describe how the valence bond model of chemical bonding works.
- Explain the fundamentals of gases and the different conversion factors for pressure.
- Identify the different gas laws and how they relate to different gas variables including but not limited to the Ideal Gas Law, Dalton’s Law of Partial Pressure, and Graham's Law.
- Use Kinetic-Molecular Theory to explain the properties of liquids and solids identifying behavior at different phase changes and interpreting phase diagrams.
- Classify and define the different intermolecular and intramolecular forces and how they influence physical properties of chemical substances.
- Describe the structure and properties of liquids and solids.
- Identify the composition of a solution by characterizing the different solutions as strong electrolyte, weak electrolyte, and non-electrolyte and how to write the equations describing the characteristics.
- Describe the uniqueness of carbon.
- Describe and draw the structure of hydrocarbons.
- Identify isomers of simple organic compounds.
- Describe the formation of polymers.
ASSIGNMENTS:
This is a course that requires pen and pencil work. You will not be successful if you don't commit yourself to the work.

Your assignments and practice will include Sapling Learning Quizzes, online Labs, Practice Quizzes located in Canvas as well as exercises and study questions from the book. Sapling learning homework is also available but not required.

To be successful in the class you should do all the assigned readings, examples, exercises, labs, and study questions from the book and the exercises.

PRACTICE QUIZZES:
Complete the practice quiz at end of each unit first. Practice quizzes are located with the rest of your course materials in Canvas and modeled after the exams. Each Practice Quiz has feedback for each question. After you complete the quiz and submit it, you will see the correct answers and the feedback for each question. You may take these practice quizzes as many times as you like to study the concepts and work out the problems. Your exam will be very closely based on the types of problems you are asked to solve in both the practice quizzes that accompany each unit. Each quiz can be completed for up to 5 points of extra credit.

SAPLING QUIZZES:
You will use your www.saplinglearning.com account to complete your quiz assignments. You can access this link by clicking on the Sapling tab located at the top of your course.

At the end of each unit you will need to complete your Quiz assignment at Sapling Learning. The quizzes are worth 5 points and you will have 5 opportunities to attempt the quizzes. You may use your book and other resources for Quiz Assignments.
  • Homework assignment are available for extra practice. These are not required nor are any points awarded for these problems.

LABS:
This course includes virtual labs developed by Carnegie Mellon. You are required to complete all the labs and submit lab reports. These reports will be graded and constitute over 20% of your final grade. The labs are quite sophisticated and expand the reach of the virtual classroom to the laboratory.

Success in the labs requires you to read the introductory material, the procedure(s), and the assignment(s) before you attempt the lab. It is also important to keep a lab notebook. Write down your observations during the experiment and record all relevant data. Submit your lab in a timely manner!

EXAMS: The course has 4 exams. Each exam covers two units. All exams have 20 questions, 10 from each unit. All questions are worth 5 points apiece. Your grade in this course will mostly depend upon your performance on the four examinations and ten labs.
COURSE ORDER: The assignments in this course are listed in a particular order for a reason. You are expected to work through the course in the order that the assignments are presented on the content tab and in the unit breakdown listed there. All labs, practice quizzes, and sapling quizzes MUST be completed prior to scheduling and completing the final exam of this course. Once the final exam is taken, no further work will be accepted or considered as part of the final grade for this course.

GRADING: Evaluation of student performance and knowledge will be based upon your lab and exam scores. The point breakdown for all assignments is as follows:

<table>
<thead>
<tr>
<th>Lab</th>
<th>Description</th>
<th>Points</th>
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<tbody>
<tr>
<td>1</td>
<td>Step-by-Step Demonstration</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Density: Solutions</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Writing Ionic and Covalent Formulas and Names</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>Stoichiometry</td>
<td>25</td>
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<tr>
<td>5</td>
<td>Dilution Problem</td>
<td>6</td>
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<tr>
<td>6</td>
<td>Heat Transfer I</td>
<td>17</td>
</tr>
<tr>
<td>7</td>
<td>Heat Transfer II</td>
<td>18</td>
</tr>
<tr>
<td>8</td>
<td>Atomic Theory</td>
<td>20</td>
</tr>
<tr>
<td>9</td>
<td>Identifying Structures</td>
<td>18</td>
</tr>
<tr>
<td>10</td>
<td>Conservation of Mass and Aqueous Solutions</td>
<td>11</td>
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**Lab Total** 170 points

<table>
<thead>
<tr>
<th>Exam</th>
<th>Points</th>
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<tbody>
<tr>
<td>1</td>
<td>100</td>
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<tr>
<td>2</td>
<td>100</td>
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<tr>
<td>3</td>
<td>100</td>
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**Exam Total** 400 points

**Sapling Quizzes 5 points (x 8)** 40 points

**Grand Total** 610 points
The breakdown of grades is as follows:

- **A** = 549 - 610 points (90 – 100%)
- **B** = 488 - 548 points (80 – 89.9%)
- **C** = 396 - 487 points (65 – 79.9%)
- **D** = 305 - 396 points (50 – 64.9%)
- **F** = 0 - 305 points (49.9% and below)

**PROBLEMS OR QUESTIONS:** If you have course content related questions, please email your instructor which can be found on the roster in Canvas. If something isn’t working right in Canvas, email cidldev@ou.edu with a description of the problem and the course you are in.

**ACADEMIC INTEGRITY CODE:**
As a student taking a course at the University of Oklahoma you are expected to uphold the academic integrity code. Please visit http://integrity.ou.edu and familiarize yourself with the standards you will be held to while taking your course.

**RELIGIOUS OBSERVANCE:**
It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

**REASONABLE ACCOMMODATION POLICY:**
Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website http://www.ou.edu/drc/home.html. Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

**TITLE IX RESOURCES AND REPORTING REQUIREMENT:**
For any concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on call 24/7. To learn more or to report an incident, please contact the Sexual Misconduct Office at 405-325-2215 (8 to 5, M-F) or OU Advocates at 405-615-0013 (24/7). Also, please be advised that a professor/GA/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office. For more information, please see http://www.ou.edu/eoo.