# CHM 114-CR1
# GENERAL CHEMISTRY I
# Fall 2020

**Class Time and Location:** Tuesday – Friday (12:52 p.m.– 1:57 p.m.)
Room #209 (Cossatot River High School Campus)
**Instructor:** Mr. Nichalas DePriest
**Office Location:** Room #209 (Cossatot River High School Campus)
**Office Hours:** Tuesday – Friday (2:02p.m. – 3:07p.m.) by appointment.
**Contact Information:**
**Telephone:** School (870) 387-4200 ext 5209
Cell (865) 805-6080
**E-Mail:** ndepriest@cossatot.us

**Prerequisite:** Successful completion of 1 1/2 units of high school algebra, OR a co-requisite MTH203 or Permission of Instructor

**Resources**

Textbook: Chemistry, Eighth Edition, by Steven S. Zumdahl. Lexington: D. C. Heath and Company, 2010. ISBN 978-0-547-12532-9

Required Materials:

1. Calculator capable of roots, exponents, and logarithms.
2. Miscellaneous pens, paper, and pencils.

**Face Mask Policy:** As per the Executive Order from the governor of Arkansas, all students are required to wear a proper face covering that completely covers the nose and mouth while on campus and in class. Masks with holes or masks that do not completely cover nose and mouth are not acceptable. Any student that does not have a proper mask will leave class and be referred to the Vice Chancellor for Student Affairs for possible disciplinary action.

**Food and Drink:** Food and drinks, including water are not allowed in the classroom at any time.

**Course Description:** General Chemistry is designed as a two-semester course. CHM 114 is the first semester of that course. It introduces the concepts of atoms, molecules and ions and the modern view of atomic structure. Stoichiometry and the Mole Concept will be stressed and problem solving will be used to a great extent in this area. The types of chemical reactions will be studied. Also included in the course will be the study of gases, thermochemistry and the periodicity of the elements. Chemical bonding is another area of importance and in-depth study. The various bonding models will be discussed. The semester will conclude with a study of nuclear chemistry and the colligative properties of solutions. These main topics will be reinforced with laboratory work.

**Program Outcomes:** The knowledge and critical thinking skills acquired in the general education component enable students to analyze problems, to arrive at intelligent conclusions, and to make reasoned choices in their professional and personal lives.

•Use analytical and reasoning skills to solve practical problems based on structure-property relationship.

•Develop critical thinking and research skills based on basic laws of nature and chemistry.

**Rationale:** Through the study of chemistry, problem solving experiences, and laboratory activity, the student develops an understanding of matter and the laws that explain the interactions between matters, including the energy changes involved. The gained knowledge is applicable in upper level chemistry courses.

**Course Objectives:** Upon completion of General Chemistry I, the student should be able to:

1. Make a variety of measurements using the Systeme International (SI) units.

2. Use dimensional analysis to convert units as well as to solve problems in general.

3. Demonstrate a working knowledge modern atomic structure and how it relates to the periodicity demonstrated by the elements on the Periodic Table.

4. Name and write the equations for ionic and covalent compounds, and balance equations involving these compounds.

5. Perform chemical calculations involving the amount of reactant and product.

6. Demonstrate a working knowledge of the different types of chemical reactions.

7. Balance oxidation-reduction equations.

8. Demonstrate a working knowledge of the composition of solutions and the reactions that take place in solution.

9. Mathematically and conceptually demonstrate a working knowledge of gases and the gas laws.

10. Demonstrate an understanding of equilibrium.

11. Demonstrate a working knowledge of energy changes in chemical reactions including: enthalpy, calorimetry, and Hess's Law.

12. Demonstrate a working knowledge of electron structure including: spectral evidence, the Wave Mechanical Model, and the Aufbau Principle.

13. Demonstrate a working knowledge of Chemical bonding including: ionic and covalent bonding, bond polarity, Localized Electron Model, Lewis structures, resonance, VSEPR Model, Molecular Orbital Model.

14. Describe the phases of matter and the structural and physical properties associated with these phases and the changes between phases.

15. Demonstrate a working knowledge of properties colligative properties including: boiling point elevation and freezing point depression.

16. Demonstrate a working knowledge of chemical kinetics including: both the integrated and differentiated rate laws.

17. Define the condition of equilibrium. (Equilibrium will be covered in depth during the second semester.)

18. Working knowledge implies not only the ability to discuss and perform pencil and paper exercises involving the topic, but also to be able to conduct laboratory investigations into the topic. A minimum of 12 laboratory activities will be part of this course.

**Topical/Unit Outline:**

Chemical Foundations:

A. Systeme Internationale
B. Conversion Factors
C. Scientific Notation

D. Significant Figures
E. Graphing
F. Use of Computer
G. Density
H. Classification of Matter

Atoms, Molecules, and Ions:
A. History of Chemistry
B. Fundamental chemical laws
C. Development of the modern atomic model
D. The periodic Table

Stoichiometry:
A. The Mole Concept
B. Atomic/Molecular mass/weight
C. Percent composition
D. Determining the formula of a compound
E. Balancing chemical equations
F. Stoichiometric calculations

Types of Chemical Reactions and Solution Stoichiometry:
A. Nature of solutions
B. Electrolyte/nonelectrolyte
C. Types of chemical reactions
D. Oxidation Reduction reactions
E. Acid Base reactions

Gases:
A. History of gas laws
B. Ideal gas laws
C. Gas stoichiometry
D. Kinetic Molecular Theory of Gases
E. Real gases

Thermochemistry:
A. Enthalpy and Calorimetry
B. Hess's Law
C. Standard enthalpies of formation

Atomic Structure and Periodicity:
A. Atomic spectrum
B. Wave Mechanical Model of the Atom
C. Quantum numbers
D. Orbital shape and energy
E. Pauli and Aufbau Principles
F. Periodicity and electron structure

Bonding:
A. Electronegativity
B. Ionic and Covalent
C. Bond polarity
D. Localized electron bonding model
E. Lewis structures
F. Resonance
G. VSEPR model
H. Hybridization
I. Molecular Orbital Model

Liquids and Solids:
A. Intermolecular forces
B. Liquid and solid states
C. Structure and bonding of metals
D. Vapor pressure and change of state
E. Phase Diagrams

Properties of Solutions:
A. Energies of solution
B. Factors affecting solubility
C. Boiling point elevation and freezing point depression
D. Colligative properties
E. Colloids

Chemical Kinetics:
A. Reaction rates
B. Rate Laws
C. Reaction mechanisms

**Course Conduct:** The class will be taught using a combination of lecture using *Powerpoint* presentation, solving in-class questions, demonstrations, group interaction and discussions, and performing laboratory experiments. Students are strongly encouraged to discuss concepts and examples as opportunities are presented during instructor presentation. It is the student's responsibility to inform the instructor when a concept is confusing or otherwise unclear. Students must answer all the in-class questions before leaving the classroom and discuss with the instructor about any confusing concept right away.

You are encouraged to solve problems forming a study group and actively taking part in discussion. You may seek assistance from Student Support Services (SSS) or Learning Enrichment Advising Center (LEAC) to check the concepts in homework assignments, quizzes, and exam reviews but it is not the responsibility of SSS or LEAC to teach the entire lesson to complete your homework, neither can you directly ask for the answer. In case of extreme difficulty, you must inform me no later than two weeks after the classes started. You cannot pass the course without completing the homework.

**UA Rich Mountain Credit Hour Calculator:** For every course credit hour, you should expect to spend at least three clock hours per week of concentrated attention on course-related work, including but not limited to time attending class, as well as out-of-class time spent completing homework, seeking help from instructor or tutors, preparing for upcoming quizzes/tests/exam, reviewing material, problem solving, and organizing your notebook. For a four hour course, a typical student should expect to spend at least twelve hours per week dedicated to this course. This includes the time spent in class. Please see credit hour calculator attached to end of syllabus.

**Course Requirements/Evaluation:**

- Major tests - 60% - will be announced at least 2 days in advance
- Laboratory reports - 25% - Late Labs NOT accepted for any reason
- Quizzes – 15% - One low quiz grade will be dropped every grading period

**Homework** will not be counted but it is expected that you complete the homework daily. You will be provided with solutions to all the problems and it will be up to you to come to me with any questions you have regarding those problems. If you don't work on the homework regularly, you will not do well on the quizzes.

**Quizzes** will mimic the homework and can cover any homework that was to be done by the day we have the quiz. Some of the quiz problems will be copied directly from the homework and others will be the same with different numbers used.

**Labs** are taken very seriously so you need to follow a specific format. If you don't follow the format in the write up instructions provided, you will get a 50 and the lab will be returned to you ungraded. Late labs are NOT accepted but one lab grade is dropped every semester. The laboratory notebook is designed to organize students' graded lab reports. The lab notebook should be brought to class the day before and the day of the laboratory experiment. **This notebook is mandatory.** If a student is missing more than one lab each term, they will be given an "incomplete" until this deficiency is corrected.

**Class Procedures/Student Requirements:**

**Assignments:** A calendar will be issued every unit with all assignments listed. It is the students' responsibility to keep up with the calendar and anything listed on it. Any changes that need to be made to the calendar will be announced in class. A calendar will also be available on the website.

**Absences and Make-up Work:** According to the school handbook, students have one day for every day absent to make up missing work. I will only make exceptions in the event of extenuating circumstances. Students will also be responsible to take any quiz or test scheduled **on the day they return** from an absence if no new material was covered in regards to that quiz/test. Students who actually miss quizzes and tests need to expect to make them up **on the day they return** during lunch, before school, or after school. The student handbook states that 6 unexcused absences within a semester will result in a failing grade for the course.

**Tardiness:** You will be counted tardy if you are not in class when the bell rings. After 5 minutes, you will be counted absent. I am an instructor who takes tardiness seriously and make no exceptions without a pass or an admit from the office.

**Study Habits** - The material in this course must be studied and learned daily as it is presented because the units build upon one another. Students should spend at least 5 hours a week studying outside of class. The actual amount of time spent will depend upon each student's background. If a student does not understand a concept, he or she should see me as soon as possible.

**Academic Dishonesty**: It is expected that each student shall do his/her own work on class works, quizzes, exams, and lab reports. Cheating, copying other's answers, writing other's statement without citing their reference are all considered plagiarism and are penalized from allowing no point in that particular unit up to dismissal from the whole course, depending on the severity of the offense.

**Disability Policy:** It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs accommodations should contact the Vice President for Student Affairs Office, 394-7622, ext. 1400.

**Arkansas Clean Air Act**: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

**Student Misconduct**: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire or safety issues, gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

**UA Rich Mountain Mission:** The University of Arkansas Rich Mountain exists to provide exemplary educational and enrichment opportunities to improve the quality of life and standard of living.

**Campus Security:** UA Rich Mountain strives to provide a safe learning environment; therefore, students who know of any security risk are asked to contact a college official. For more information follow this link and look under the title Health and Safety: http://www.uarichmountain.edu/at-a-glance/disclosures

During the semester, due to unforeseen circumstances, it may be necessary to add to or delete from this document. This will only be done with adequate notification to the students affected.

| Credit Hour Requirement Calculator | | | | |
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| **Course Information** | | | | |
| Department, Course Number | CHM 114 | | | |
| Course Title | General Chemistry I | | | |
| Credit Hours | 4 | | | |
| Mode of Delivery | Traditional | | | |
| Weeks in Part of Term | 15 | | | |
| Level of Reading Material | Advanced/Scientific/Technical (2) | | | 2 |
| Reading Level of Students | Average Student (2) | | | 2 |
| Average Pages per Hour | 10 | | | |
| | | | | |
| | | *Enter either week or term, not both* | | |
| **Contact Hours** | | **Hours/Week** | **Hours/Term** | **Total Hours** |
| Lecture/Recitation | | | 45 | 45 |
| Lab Contact Hours | | | 24 | 24 |
| | **Pages Asg'd** | **Hours/Week** | **Hours/Term** | |
| **Syllabus Items** | | | | |
| Reading | 380 | | | 38 |
| Assignment | | 1 | | 15 |
| Quiz | | 1 | | 15 |
| Researching Lab questions | | 2 | | 30 |
| Reviewing for exams | | | 10 | 10 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | |
| **Total Hours** | | | | 177 |
| **Required Hours** | | | | 150 |
| **Difference** | | | | Ok + 27 |