CHEM 1103 - lec CR1
UNIVERSITY CHEMISTRY I
Fall 2023

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:
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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.

Course Description: This course is a 3 credit hours course and is designed to provide the basic Chemistry background necessary for science majors such as Physics, Chemistry, Biology, Biochemistry, Pharmacy, Forestry, Medicines, Engineering, etc. The fundamental theories of Chemistry including measurements, periodic law, atomic theory, stoichiometry, thermochemistry, Nuclear chemistry, chemical reactions, and bonding and structure are covered. Must take the Laboratory course CHEM1101 concurrently with this course to have full 4 credit hours.

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 University 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) check the concepts in homework assignments and exam reviews but the instructor is the primary source of information. You must inform me no later than 1 week after the classes started if you feel that the difficulty level is too high. You cannot pass the course without completing the Blackboard assignments after properly studying. Expect a minimum of 12 hours of work on this class

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.

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.

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 points 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. 1460.

Title IX and Discrimination Policy: UA Rich Mountain adheres to a policy that enables all individuals regardless of race, color, gender, national origin, age, religion, sexual orientation, veteran's status, or disability, to work and study in an environment unfettered by discriminatory behavior or acts. Harassment of an individual or group will not be condoned, and any person (student, faculty, of staff member) who violates this policy will be subject to disciplinary action.

Harassment that is considered discriminatory includes actions or conduct (verbal, graphic, gestural, or written) directed against any person or group with the intent to demean or create a hostile or threatening environment. It is not the intent of this policy to infringe upon or limit educational, scholarly, or artistic expression. Any person who believes he or she has been discriminated against should contact the Title IX Coordinator to obtain assistance and information concerning the filing of a complaint.

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.

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

UA Rich Mountain Mission: UA Rich Mountain provides transformative education to all learners.

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				
Course Information				
Department, Course Number	CHEM 1103 - lec CR1			
Course Title	University Chemistry I			
Credit Hours	3 + 1 = 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