PRINCIPLES OF CHEMISTRY CHEM 1053 (Lecture) Fall 2022

Class Time and Location: MW 8:00 - 9:20 AM, **Room:** S235
Instructor: Gaumani Gyanwali – Ph. D.: OSU-Stillwater; MS, BS: Tribhuvan University
Office Location: S244
Office Hours: Posted on the office door
Contact Information: Office: (479)-394-7622, Ext. 1339
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Prerequisite: A grade of 'C' or better in Elementary Algebra.

Resources:

Textbook: Chemistry Tenth Edition, by Karen Timberlake. New York: Pearson Benjamin Cummings, 2009 *ISBN 978-0-13-603522-0*

Required Materials:

1. Calculator capable of roots and exponents
2. 1inch or 1and1/2 inch binder for in-class worksheets and notes

Course Description: This is an introductory course in chemistry designed to meet the needs of students in nursing, home economics, and other non-science majors. This course may not be taken for credit after successful completion of University Chemistry I.

Program Outcomes: The purpose of the Associates of Arts Program is to provide the student with the knowledge and critical thinking skills that will enable them to analyze problems, arrive at intelligent conclusions, and make reasoned choices in his or her professional and personal life.

- Students will demonstrate an understanding of physical and chemical principles.
- Students will demonstrate an understanding of one-step mathematical calculations and applications.
- Students will apply technological skills to identify, locate, and process information.
- Students will be prepared academically upon transfer to a four-year institution.

Rationale: Through the study of chemistry, problem solving experiences, and laboratory activity, the student develops an understanding of mater and the laws that explain the interactions between matters, including the energy changes involved.

Course Objectives: Upon completion of Principles of Chemistry, the student should be able to:

1. Make a variety of measurements using the Systeme Internationale (SI) units.
2. Use dimensional analysis to convert units and to solve problems in general. (Components: analyze, evaluate, and interpret data)
3. Demonstrate a working knowledge of modern atomic structure as it relates to 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. (Components: critical thinking skills compare and contrast)
5. Perform chemical calculations involving the amount of reactant and product. (Components: calculate, correlate, compare, and solve problems)
6. Demonstrate a working knowledge of the different types of chemical reactions.
7. Demonstrate a working knowledge of the composition of solutions and the reactions that take place in solution. (Components: calculate, correlate, compare, and solve problems)
8. Demonstrate an understanding of gases and the gas laws both mathematically and conceptually. (Components: calculate, correlate, distinguish, and solve problems)
9. Demonstrate an understanding of chemical bonding.

10. Describe difference between the properties and examples of acids and bases, calculation of pH values. (Components: calculate, identify, apply, compare, and solve problems)
11. Demonstrate a working knowledge of basic organic chemistry including hydrocarbons and substituted hydrocarbons. (Components: differentiate, comprehend, classify, logical arguments)

Topical/Unit Outline:

I. Measurements:
A. Scientific Methods
B. Systeme Internationale
C. Conversion Factors
D. Scientific Notation
E. Significant Figures
F. Density

II. Energy and States of Matter:
A. Temperature
B. Heat
C. States of matter

III. Atomic Structure and Periodic Table

1. Atomic Structure
A. The atom
B. Atomic number and mass number
C. Isotopes
D. Atomic energy levels
E. Electron Energy levels

2. Periodic Table
A. Classification of Matter
B. Elements and symbols
C. The Periodic Table
D. Metals, Non-metals, and Metalloids
E. Periodic Trends: Atomic Size and Ionization Energy

IV. Chemical Bonding:
A. Valence electrons
B. Octet rule
C. Ionic and Covalent bonds
D. Naming ionic and covalent compounds
E. Polyatomic ions
F. Electronegativity

V. Chemical Quantities and Reactions:
A. The Mole
B. Molar Mass
C. Chemical changes
D. Balancing chemical equations
E. Types of chemical reactions
E. Calculations using Mole concept

VI. Gases:
A. Kinetic Molecular Theory of Gases

B. Gas Pressure
C. Boyle's Law, Charles law and Avogadro's Law
D. Ideal gas law

VII. Properties of Solutions:
A. Solutes and solvents
B. Solubility
C. Concentration
D. Dilution
E. Colloids
F. Osmosis and Dialysis

VIII. Acids and Bases:
A. Bronsted-Lowry acids and bases
B. pH scale and calculations
C. Buffers
D. Acid-Base titrations

IX. Nuclear Radiation:
A. Radioactivity
B. Nuclear equations
C. Measuring Radiation
D. Half-life
E. Medical applications
F. Fission and Fusion

X. Organic Chemistry:
A. Properties of organic compounds
B. Formulas
C. IUPAC naming system
D. Alkanes, Alkenes, Alkynes
E. Isomers
F. Aromatics
G. Alcohols

Tentative Schedule for Lecture: Principles of Chemistry

Week	Topics/Activities by Book Chapter	Date/Day
1	Discuss syllabus; Pre-test, Measurement	8/22 M, 8/24 W
2	Energy and States of Matter Atomic Structure and Periodic Table	8/29 M 8/31 W
3	*Labor Day holiday, no class* Atomic Structure and Periodic Table	*9/5 M* 9/7 W
4	Atomic Structure and Periodic Table Review	9/12 M 9/14 W
5	**Test 1** Chemical Bonding	**9/19 M** 9/21 W
6	Chemical Bonding Chemical Quantities and Reaction	9/26 M 9/28 W
7	Chemical Quantities and Reaction Review	10/3 M 10/5 W
8	*Instructor at a conference, no class* **Test 2**	*10/10 M* **10/12 W**
9	Gases	10/17 M, 10/19 W
10	Properties of Solution	10/24 M, 10/26 W
11	Acid and Bases	10/31 M, 11/2 W
12	Review **Test 3**	11/7 M **11/9 W**
13	Nuclear Chemistry	11/14 M, 11/16 W
14	*Thanksgiving break, no class*	*11/21 M – 11/25 W*
15	Organic Chemistry/Review	11/28 M, 11/30 W
16	**Test 4**	**12/5 M**
17	**Final Exam**	**12/7 W**

Course Conduct: The class will be taught using a combination of lecture using *Powerpoint* presentation, solving in-class questions, demonstrations, and group interaction and discussions. 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) to check the concepts in homework assignments, quizzes, and exam reviews but you cannot directly ask for the answer. You cannot pass the course without completing the homework. 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 (Grading):

Your grade for this course comes from 4 tests (100 points each) after completion of two or three chapters, one comprehensive final exam given in the finals week (100 points), and ten assignments (on average of 40 points each)

Four tests @100 each	= 300 (lowest one dropped when taken all four)
One Final Exam @ 100	= 100
10 Assignments @ 40 each*	= 400
Total points possible	**= 800**

*Total points for an individual assignment may change based on the weightage of the chapter

The final grade for the course will be determined by dividing the student's total number of points earned by the number of possible points. Grades are assigned on the basis of the following percentage scale, after rounding the calculated percentage to the nearest whole number:

90-100	**A**
80- 89	**B**
70- 79	**C**
60- 69	**D**
<60	**F**

Class Procedures/Student Requirements:

On-Campus Resources:

1. Your course module on Blackboard will be populated with the lecture slides for each upcoming chapter. If you wish, you can print the lecture slides of the chapter.
2. You will have in-class practice worksheets to see how the instructor performs the calculations and chemical formulas. Retain those worksheets for future information and knowledge.
3. Student Support Services will have some basic information available about time management, difficulty of the course etc.

tutor.com provides 5 hours of free tutoring online for each UA Rich Mountain student per semester. Johnson Learning Commons has contract with this online site where personal tutors are available 24/7. Create an account and get help personally from home or anywhere if internet access is available. Follow the link to log in www.tutor.com/uarichmountain

Attendance: Absence in this course most often results into failing grades unless covered by immediate action and make-up work. Absence is strictly prohibited unless any unavoidable circumstances. If notified of the absence, the instructor can send you needed information and you can recover your loss with completed work. It is your full responsibility to complete the missed work and cover the missed chapter.

Assignment Due Dates: Students are expected to submit the assignments and other works on or before the assigned due dates. You will be penalized for the late works depending on the number of days and full point and importance of the works assigned.

Make-up Work Policy**:** Make up work should be competed promptly after the absence. A maximum of one week will be the guideline. Make-up exams are given only in instances of the most unavoidable, serious circumstances. Prior notice of absence from an exam is required. Upon return after an absence the student is expected to be prepared for the days' class activities.

Cell Phone Policy**:** Do not use the cellphone unless allowed by the instructor.

Extra Credit Opportunity: Optimum student involvement in the course as well as course-related activities is highly recommended and rewarded with extra credit. The value of extra credit points varies with the nature of the activity and the application of that activity in the real life as well as relation of the activity with the course. Points that can be received are unlimited. Simple idea is: the more you are involved in real life science experiences, the more you understand and enjoy it, and you get good grades!!! Some examples of activities (but not limited to) that earn extra credit points include:

a) Completing the 'boxed' problems within the chapter for each exam that you give.
b) Being an active member of the Science Club coordinated by the instructor
c) Organize activities within the Science Club or participate actively in the activities organized by the Club
d) Taking leadership in group study sessions and manage study sessions with peers
e) Organize or be involved in science and technology awareness activities and helping society to improve utilizing science knowledge
f) Actively participating in science-related meetings and conferences on/off campus
g) Any other science related activities and duties beyond the demand of the course deemed worthy of extra credit by the instructor

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.

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.

Face mask policy: Students are encouraged but not required to wear face masks in class and public spaces.

Attendance Policy: For attendance purposes, a student who is displaying symptoms of illness must email: contact.tracing@uarichmountain.edu to determine next steps for an excused absence related to COVID or flu. Contacting an instructor **DOES NOT** start this process or guarantee an excused absence.

Food and Drink: Food and drinks, except water in a closed container, are not allowed in the classroom.

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-Chancellor 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: UA Rich Mountain provides transformative education to all learners.

Credit Hour Requirement Calculator				
Course Information				
Department, Course Number	CHEM1053(Lecture) and CHEM1051L(Lab)			
Course Title	Principles of Chemistry			
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			
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	350			35
Assignment		1		15
Online Quiz		1		15
Researching Lab questions		2		30
Reviewing for exams			10	10
				0
				0
				0
				0
				0
Total Hours				174
Required Hours				150
Difference				Ok + 24