SCI 122-GENERAL CHEMISTRY 1- COURSE OUTCOMES

General Chemistry I SCI 122		
As a result of home classroom and laboratory study, the at the end of this course will demonstrate the following knowledge and skills:		
OUTCOMES	**ACTIVITIES**	**ASSESSMENT**
Describe matter in terms of accepted models, classify matter based on the atomic model, describe and perform scientific measurements and unit conversions needed in chemistry.	1. Explore the atomic view of matter. . 2. Understand basic terms related to properties and changes in matter 3. Express and operate in scientific notations. . 4. Understand the different system of units and unit conversions. 5. Express experimental data using correct significant figures. 6. Distinguish between precision and accuracy.	1. Hands-on Lab work. 2. Graded assignments. 3. In-class problems. 4. In-class tests
Describe atoms on the basis of protons, electrons and neutrons, use symbols and formulas to describe atoms of elements and molecules, perform mass calculations related to atoms and molecules	1. Use symbols of elements to write formulas for compounds. 2. Identify characteristic properties of protons, neutrons and electrons. 3. Write correct symbols for isotopes and calculate average atomic masses. 4. Use atomic masses to calculate molecular masses. Use the mole concept as a means of counting atoms and molecules by weighing and perform factor unit calculations.	1. Hands-on Lab work. 2. Graded assignments. 3. In-class problems. 4. In-class tests
Describe electron structure of atoms and ions using quantum theory, the shell model and Lewis model, and use it to explain the periodic table, periodic properties and trends.	1. Write detailed electron structure for atoms using orbital filling guides. 2. Understand the meaning of shells, subshells and orbitals. 3. Use electron structure to classify the elements based on distinguishing electrons. 4. Recognize the different groups and periods. 5. Identify location of an element by family and period. 6. Describe trends in properties both	1. Hands-on Lab work. 2. Graded assignments. 3. In-class problems. 4. In-class tests

	physical and chemical; atomic size	
Describe formation of different types of chemical bonds and related substances based on noble gas rule for bonding and exceptions to noble gas rule. Write formulas for ionic compounds and apply IUPAC rules to name compounds. Be able to write Lewis structures for simple molecules and relate structure to molecular geometry and chemical reactivity.	1. Use Lewis structure of atoms and electron configuration and electronegativity property to determine what atoms gain, lose or share electrons to form ionic or covalent bonds. 2. Write correct Lewis structure for simple molecules. 3. Be able to write formulas and name ionic compounds. 4. Be able to name simple binary covalent compound given correct formula. 5. Use VSEPR theory and Lewis structure to predict molecular geometry. 6. Use difference in ENV to distinguish between polar and non-polar compounds. Describe other forces	1. Hands on lab work 2. Graded assignments 3. In-class problems 4. In-class tests
Describe reactions using equations, classify reactions, and use equations for mass calculations in reactions.	4. Identify reactants and products in a given equation 5. Assign ON's to elements in formulas 6. Identify oxidizing and reducing agents 7. Classify reactions as redox or non redox 8. Classify reactions as combination, decomposition, single displacement or double displacement 9. Distinguish exothermic vs endothermic reactions 10. Use balanced equations to calculate expected yield, needed amount of reactants, % yield and limiting reactant(s).	1. Hands-on lab work 2. Graded assignments 3. In-class problems 4. In-class tests
Apply the KMT to explain variation in properties of the three states of matter, describe the various gas laws, understand relation between temperature and changes in state	1. Describe and understand the KMT of matter 2. Do calculations related to pressure, temperature 3. Do calculations based on Boyle's, Charles's, combined, Ideal, Graham's, Dalton's, and Avogadro's laws 4. Do calculations of energy changes that accompany exothermic and endothermic processes 5. Understand basic terms related to changes of state	1. Hands-on lab work 2. Graded assignments 3. In-class problems 4. In-class tests
Describe the solution processes, classify solution types and properties,	1. Be able to classify mixtures as homogeneous and heterogeneous,	1. Hands-on lab work 2. Graded assignments

express solution concentrations using commonly used methods, prepare desired solution by weighing or by dilution, do solution stoichiometry, distinguish between solutions and colloids, understand importance of solutions in biological processes	2. Understand basic terms related to solubility and solutes 3. Calculate solution concentrations in molarities and percentage by mass or volume 4. Do stoichiometric calculations based on solution concentration 5. Be able to prepare solutions of desired concentration starting from pure solutes and solvents 6. Describe colligative properties and do calculations related to colligative properties 7. Demonstrate an understanding of osmosis, dialysis colloidal properties	3. In-class problems 4. In-class tests
Calculates rates for equilibrium reactions experimentally, write equilibrium expressions, understand factors that affect rate, interpret energy diagrams, relate molecular collision and rate, use concept of entropy to predict spontaneity of reactions	1. Calculate rates and rate constants 2. Use collision theory to explain factors that affect rate 3. Understand reaction progress and energy diagrams 4. Write rate law for different order reactions 5. Use Le Chatelier's principle to determine position of equilibrium under stress	1. Hands-on lab work 2. Graded assignments 3. In-class problems 4. In-class tests
Gain general knowledge about acids, bases, salts and buffers, define acids and bases using Arrhenius, Bronsted and Lewis theories; do Ph calculations for strong acids and bases, name acids and bases, write equations for acid base reactions	1. Write equations to illustrate the different ways of defining acids and bases 2. Name binary and ternary acids 3. Name bases and salts 4. Do Ph calculations 5. Write equations to show how salts are prepared 6. Distinguish between strong and weak acids and bases and applicable Ph calculations 7. Explain how buffers are prepared and their Ph calculated	1. Hands-on lab work 2. Graded assignments 3. In-class problems 4. In-class tests
Gain general understanding of the nuclear process; know units of radiation and medical uses of radioisotopes; write equations for nuclear reactions and effects of radiation	1. Describe common forms of radiation 2. Write balanced equations for nuclear reactions 3. Solve problems related to half life 4 Describe effects of radiation 5. Understand units of radiation 6. Explore medical uses of radioisotopes 7,Distinguish between fission and fusion	1. Hands-on lab work 2. Graded assignments 3. In-class problems 4. In- class tests