COURSE OUTLINE: CHM190 - CHEMISTRY I

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Course Code: Title	CHM190: CHEMISTRY I FOR PADD
Program Number: Name	3065: PRE-HEALTH DIP DGR
Department:	PRE-HEALTH
Academic Year:	2024-2025
Course Description:	In this course, students will examine the fundamental concepts, procedures, and calculations of chemistry. Course work will include examples and problems that relate to health and the human body. Topics in this course include properties of matter, chemical bonding, atomic and molecular structure, chemical nomenclature, chemical quantities, chemical equations, stoichiometry, the gas laws, and solutions and solubility. Laboratory investigations in this course will focus on safety, measurement, and common practices and procedures. The purpose of the lab work is to develop practical skills while gaining a better understanding of the theoretical concepts and calculations.
Total Credits:	5
Hours/Week:	5
Total Hours:	70
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
This course is a pre-requisite for:	CHM191
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**3065 - PRE-HEALTH DIP DGR** VLO 2 Examine concepts, processes and systems of chemistry, including atomic and molecular structure; quantities in chemical reactions; solutions and solubility; acids and bases; as well as organic chemistry and biochemistry in relation to health and the human body. VLO 6 Investigate health sciences and science-related questions, problems and evidence using the scientific method.
Essential Employability Skills (EES) addressed in this course:	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others.

	EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
General Education Themes:	Science and Technology
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Students must achieve an average of 50% on tests, independent of other components, to obtain a passing grade in this course. Students must complete all labs designated as mandatory to obtain a passing grade in this course.
Books and Required Resources:	General, Organic, and Biological Chemistry: Structures of Life by Karen C. Timberlake Publisher: Pearson Edition: 6 ISBN: 9780134730684 or 9780134763071 Safety Glasses & Lab Coat

Course Outcomes and Learning Objectives:

Course Outcome 1	Learning Objectives for Course Outcome 1
1. Explain the structure, organization, and properties of matter.	1.1 Classify matter based on its state (solid, liquid, or gas) and composition (type of pure substance or mixture) using appropriate terminology. 1.2 Distinguish between physical and chemical properties. 1.3 Describe atomic structure and determine numbers of subatomic particles in a given isotope. 1.4 Explain the effect that isotopes have on the atomic mass (weight) of an element. 1.5 Represent an isotope using its atomic and mass numbers. 1.6 Determine the electron configuration for an element. 1.7 Relate an element`s electron configuration to its position (s, p, or d block) on the periodic table. 1.8 Compare the properties of elements in subdivisions of the periodic table: periods, groups, metals, non-metals, and metalloids. 1.9 Identify and explain periodic trends with respect to atomic size, ionization energy, electronegativity, number of energy levels, number of valence electrons, and reactivity.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Apply principles of chemical and intermolecular bonding.	2.1 Determine the number of valence electrons and their involvement in the formation of chemical bonds. 2.2 Determine the polar character of bonds using the concept of electronegativity. 2.3 Write the Lewis structures for atoms, molecules and

	polyatomic ions. 2.4 Apply VSEPR theory to draw linear, trigonal planar, trigonal pyramidal, tetrahedral, and bent shapes for covalently bonded molecules. 2.5 Use electronegativity and molecular shape to determine the polarity of a molecule. 2.6 Relate polarity to the forces (i.e. hydrogen bonds, dipole-dipole attractions, and dispersion forces) that occur between molecules. 2.7 Explain how bond types and intermolecular forces account for the properties of molecular and ionic compounds, covalent networks, and metallic substances. 2.8 Use the octet rule to determine ion symbols and chemical formulas. 2.9 Use the chemical formula of a compound to determine its IUPAC name. 2.10 Use the IUPAC name of a compound to determine its chemical formula.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Perform measurements, calculations, and conversions with appropriate accuracy and precision.	3.1 Identify a number as measured or exact. 3.2 Indicate the uncertainty associated with a particular measurement. 3.3 Use appropriate metric or SI units, especially when recording measurements of length, mass, volume, temperature, and time. 3.4 Express a measured or calculated value using scientific notation. 3.5 Round off the result of a calculation to the appropriate number of significant digits. 3.6 Determine the mass, volume, density, or specific gravity of a substance. 3.7 Explain the meaning of moles, mass, molar mass, and Avogadro`s number. 3.8 Calculate moles, mass, molar mass, and number of particles for a substance. 3.9 Determine the percent composition of a compound or mixture. 3.10 Describe three commonly used temperature scales and perform conversions from one to another.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Analyze chemical reactions qualitatively and quantitatively.	4.1 Distinguish between physical and chemical changes. 4.2 Identify the parts of an equation representing a physical or chemical change. 4.3 Predict the products and write balanced equations for combination, decomposition, combustion, replacement, and double replacement reactions. 4.4 Identify a redox reaction and determine which reactant is oxidized and which reactant is reduced. 4.5 Label the parts of an electrochemical cell and use half-reactions to explain electron transfer.

	4.6 Describe the stoichiometric relationships among the substances involved in a balanced chemical reaction. 4.7 Given a quantity in moles or mass of a substance, use a mole-mole factor from the balanced equation to calculate the moles or mass of another substance in the reaction. 4.8 Determine the limiting reactant and calculate the percent yield of a product.
Course Outcome 5	**Learning Objectives for Course Outcome 5**
5. Analyze solutions qualitatively and quantitatively.	5.1 Describe the types and properties of solutions. 5.2 Explain the importance of water as a solvent. 5.3 Describe the factors that affect the solubility of a solute. 5.4 Predict the solubility of both ionic and molecular compounds. 5.5 Use solubility data to calculate the quantity of solute that will dissolve in a given amount of solvent. 5.6 Differentiate between strong, weak, and non-electrolytes. 5.7 Perform calculations involving various units of concentration (ex. mass/mass percent, mass/volume percent, volume/volume percent, molarity) 5.8 Describe the dilution process and perform dilution calculations. 5.9 Write a net ionic equation for a reaction occurring in aqueous solution. 5.10 Perform stoichiometric calculations involving reactions in solution.
Course Outcome 6	**Learning Objectives for Course Outcome 6**
6. Apply the gas laws qualitatively and quantitatively.	6.1 Describe the properties of an ideal gas. 6.2 Explain and apply Avogadro`s Law, Boyle`s Law, Charles` Law, Gay-Lussac`s Law, the Combined Gas Law, and the Ideal Gas Law to real-world and health-related situations. 6.3 Solve quantitative problems involving the gas laws. 6.4 Perform stoichiometric calculations for chemical reactions involving gases.
Course Outcome 7	**Learning Objectives for Course Outcome 7**
7. Conduct laboratory investigations using appropriate scientific techniques.	7.1 Follow a provided lab procedure safely, accurately and efficiently. 7.2 Select the most appropriate equipment for performing a particular measurement. 7.3 Use proper measurement techniques for the precise and accurate collection of quantitative data. 7.4 Make clear and concise qualitative observations. 7.5 Record data using tables. 7.6 Use scientific reasoning to draw conclusions that explain investigation results.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Labs	30%

	Tests	70%
Date:	August 19, 2024	
Addendum:	Please refer to the course outline addendum on the Learning Management System for further information.	