CHEM-1120G Course Map

Course Learning Objectives

1. Follow the scientific method, use the different systems of measurements, and perform conversions within the same system of measurements, convert between floating decimal numbers and scientific notation and identify significant figures (CO1).
2. Define what basic properties of materials are, how they are measured, what units are used and how to calculate properties such as density (CO2).
3. Calculate values using the gas laws and understand how these laws relate to everyday situations (CO3).
4. Differentiate between a physical and chemical property or change, an element and a compound, and distinguish a pure substance from a mixture (CO4).
5. Describe the basic structure of an atom and the 3 subatomic particles (CO5).
6. Understand the organization of the periodic table, be able to identify the name of an element from its symbol and vice versa, and understand the reactivity pattern of elements (CO6).
7. Explain the concept of nuclear reactions and predict outcomes (CO7).
8. Learn how a compound is formed, the differences between covalent and ionic compounds and construct the formulas and names of these compounds (CO8).
9. Relate the types of bonds in the compounds to the properties of the materials and how they interact and demonstrate how the bonding in water makes it unique (CO9).
10. Write chemical equations for reactions, balance the equations, and calculate quantities in reactions (CO10).
11. Clarify the different types of energy, and how energy is released or absorbed in a reaction (CO11).
12. Illustrate the acid-base concept and how it affects the human body (CO12).
13. Understand oxidation-reduction reactions and how they apply to energy production (CO13).
14. Learn the various organic chemicals, the functional groups that identify them (CO14).
15. The major food groups: carbohydrates, proteins, lipids and vitamins and minerals (CO15).
16. Solve critical thinking and application problems (CO16).
17. Write lab report (CO17).

Module	Topic	Learning Objectives	Instructional Materials	Assignments	Assessments
Getting Started	Getting Started	• Identify the main course topics found in the syllabus. • Become familiar with the structure and organization of the course. • Introduce yourself to your classmates. • Identify DACC mental health and social services. • Obtain your textbook in Brytewave. • Download Lockdown Browser. • Sign up for Labster.	• Syllabus • Introduction video • Videos and documents • BryteWave Course Materials link • Lockdown Browser link • Labster Access Instructions.pdf	• Syllabus/Intro Quiz • Introduce Yourself • DACC Mental Health Resources quiz	
Module 1	Chemistry in Our Lives	• Define the term chemistry (CO1) • Identify substances as chemicals (CO1) • Describe the activities that are part of the scientific method (CO1) • Review math concepts used in chemistry (CO1) • Write a number in scientific notation (CO1)	Ch-1 ppt & Ch- 1 Video	Ch-1 discussion & Ch-1 homework	Quiz 1 & Exam 1
Module 2	Chemistry and Measurements	• Write the names and abbreviations for the	Ch-2 ppt & Ch-2 Video	Ch-2 discussion & Ch-2 homework	Quiz 1 & Exam 1

		metric or SI units used in measurements (CO2). • Identify a number as measured or exact; determine the number of significant figures in a measured number (CO1 & CO2). • Adjust calculated answers to give the correct number of significant figures (CO2). • Use the numerical values of prefixes to write a metric equality (CO2). • Write a conversion factor for two units that describe the same quantity (CO2). • Use conversion factors to change from one unit to another (CO2). • Calculate the density of a substance (CO2)			
Module 3	Matter and Energy	• Classify examples of matter as pure substances or mixtures (CO4). • Identify the states and the physical and chemical properties of matter (CO4). • Given a temperature, calculate the corresponding	Ch-3 ppt, Ch-3 Video, & Exam 1 Study Guide	• Ch-3 discussion, • Ch-3 homework • Matter and Phase Changes: Distill ethanol lab Simulation	Quiz 1 & Exam 1

		temperature on another scale (CO4). • Identify energy as potential or kinetic; convert between units of energy (CO11). • Use the energy values to calculate the kilocalories (kcal) or kilojoules (kJ) for a food (CO15). • Use specific heat to calculate heat loss or gain (CO11). • Describe the changes of state between solids, liquids, and gases; calculate the energy released or absorbed (CO4).			
Module 4	Atoms and Elements	• Write correct symbol and name of elements (CO6). • Use the periodic table to identify the group and the period of an element; identify the element as a metal, a nonmetal, or a metalloid (CO6). • Describe the electrical charge and location in an atom for a proton, a neutron, and an electron (CO5).	Ch-4 ppt & Ch- 4 Video	• Ch-4 discussion, • Ch-4 homework, • Atomic Structure (Principles): Atoms and Isotopes, • Introduction to the Groups of the Periodic Table Lab Simulations	Quiz 2 & Exam 2

		• State the number of protons, neutrons, and electrons (CO5). • Determine the number of protons, electrons, and neutrons in one or more of the isotopes of an element; identify the most abundant isotope of an element (CO5). • Write the electron arrangement (CO6). • Use the electron arrangement of elements to explain the trends in periodic properties (CO6).			
Module 5	Nuclear Chemistry	• Describe alpha, beta, positron, and gamma radiation (CO7). • Write a balanced nuclear equation for radioactive decay, showing mass numbers and atomic numbers (CO7). • Describe the detection and measurement of radiation (CO7). • Calculate the amount of radioisotope remaining after one or more half-lives (CO7).	Ch-5 ppt & Ch-5 Video	• Ch-5 discussion, • Ch-5 homework, • Gen Ed Assessment/Group Project Assignment	Quiz 2 & Exam 2

		• Describe the use of radioisotopes in medicine (CO16). • Describe the processes of nuclear fission and fusion (CO7). • Write a lab report on the Impact of Carbon Dioxide in Our Lives and Sustainable Solution (CO17).			
Module 6	Ionic and Molecular Compounds	• Write the symbols for the simple ions of the representative elements (CO8). • Write the correct formula for an ionic compound (CO8). • Write the correct name of an ionic compound (CO8). • Write the name and formula for an ionic compound containing a polyatomic ion (CO8). • Write its correct name and formula of a molecular compound (CO8). • Draw the Lewis structures for molecular compounds (CO9).	Ch-6 ppt, Ch-6 Video, Exam 2 Study Guide	• Ch-6 discussion, • Ch-6 homework, • Ionic and Covalent Bonds Lab Simulation	Quiz 2 & Exam 2

		• Use electronegativity to determine the polarity of a bond (CO9). • Predict the three-dimensional structure of a molecule (CO9). • Classify molecules as polar or non-polar. Describe the intermolecular forces between ions, polar covalent molecules, and non-polar covalent molecules (CO9).			
Module 7	Chemical Quantities and Reactions	• Use Avogadro's number to determine the number of particles in a given number of moles (CO10). • Calculate its molar mass (CO10). • Use molar mass to convert between grams and moles (CO10). • Write a balanced chemical equation; determine the number of atoms in the reactants and products (CO10). • Identify a chemical reaction as a combination, decomposition, single replacement, double	Ch-7 ppt & Ch- 7 Video	• Ch-7 discussion, • Ch-7 homework, • Intermolecular Forces: Rediscover the forces to save the world! Lab Simulation	Quiz 3 & Exam 3

		replacement, or combustion (CO10).			
Module 8	Gases	• Describe the kinetic molecular theory of gases and the units of measurement used for gases (CO3). • Use the pressure–volume relationship (Boyle's law) to calculate the unknown pressure or volume (CO3). • Use the temperature–volume relationship (Charles's law) to calculate the unknown temperature or volume (CO3). • Use the temperature–pressure relationship (Gay-Lussac's law) to calculate the unknown temperature or pressure (CO3). • Use the combined gas law to calculate the unknown pressure, volume, or temperature of a gas (CO3).	Ch-8 ppt & Ch-8 Video	• Ch-8 discussion, • Ch-8 homework, • Ideal Gas Law: Apply to Save a Life Lab Simulation	Quiz 3 & Exam 3
Module 9	Solutions	• Identify the solute and solvent in a solution; describe the formation of a solution (CO9).	Ch-9 ppt & Ch- 9 Video	• Ch-9 discussion, • Ch-9 homework, • Osmosis and Diffusion: Choose the right solutions for the	• Quiz 4, • Exam 4, • Final Comprehensive Exam

		• Identify solutes as electrolytes or nonelectrolytes (CO9). • Define solubility; distinguish between an unsaturated and a saturated solution. • Identify an ionic compound as soluble or insoluble (CO9). • Describe the electrical charge and location in an atom for a proton, a neutron, and an electron (CO5). • Calculate the concentration of a solute in a solution; use concentration as a conversion factor to calculate the amount of solute or solution (CO10). • Describe the dilution of a solution; calculate the unknown concentration or volume when a solution is diluted (CO10). • Identify a mixture as a solution, a colloid, or a suspension. Describe how the number of particles in a		intravenous drip Lab Simulation	

		solution affects the osmotic pressure (CO16)			
Module 10	Acids and Bases and Equilibrium	• Describe and name acids and bases (CO12). • Identify conjugate acid–base pairs for Brønsted–Lowry acids and bases (CO12). • Write equations for the dissociation of strong and weak acids and bases (CO12). • Use Le Châtelier's principle to determine the effect on equilibrium concentrations when reaction conditions change (CO12). • Use the water dissociation expression to calculate the [H3O+] and [OH−] in an aqueous solution (CO12). • Calculate [H3O+] and the pH of a solution (CO12). • Write balanced equations for reactions of acids with metals, carbonates or bicarbonates, and bases; calculate the molarity or volume of an acid from titration information (CO10).	Ch-10 ppt & Ch-10 Video	• Ch-10 discussion, • Ch-10 homework, • Acids and Bases: Acidity and Alkalinity in Everyday Substances Lab Simulation.	• Quiz 4, • Exam 4, • Final Comprehensive Exam

		• Describe the role of buffers in maintaining the pH of a solution (CO12).			
Module 11	Introduction to Organic Chemistry: Hydrocarbons Learning Materials	• Identify properties characteristic of organic or inorganic compounds (CO14). • Write the IUPAC names and draw the condensed structural and line-angle formulas for alkanes and cycloalkanes (CO14). • Identify the properties of alkanes and write a balanced chemical equation for combustion (CO14). • Write the IUPAC names or draw the condensed structural or line-angle formulas for alkenes and alkynes (CO14) • Draw the condensed structural formulas and give the names for the cis–trans isomers of alkenes (CO14)	• Ch-6 ppt, • Ch-6 Video, • Exam 2 Study Guide, • Final Exam study Guide, • Practice Final Exam, & Answer Key	• Your Diet and Your DNA Lab Simulation	• Quiz 4, • Exam 4, • Final Comprehensive Exam