Course Number **Course Name**	CHEM 1225 General Chemistry II for STEM Majors
Credit Value (Breakdown of theory and lab credits)	3 Theory
Catalog Course Description	A continuation of CHEM 1215. Prerequisite: CHEM 1215/L. Co-requisite: CHEM 1225L. (3, 3T+0L) Meets New Mexico Lower Division General Education Core Curriculum Area III Laboratory Science (NMCCN CHEM 1224 with lab)
Course Student Learning Outcomes/Objectives /Competencies	1. Explain the intermolecular attractive forces that determine physical properties and phase transitions, and apply this knowledge to qualitatively evaluate these forces from structure and to predict the physical properties that result. 2. Calculate solution concentrations in various units, explain the effects of temperature, pressure and structure on solubility, and describe the colligative properties of solutions, and determine solution concentrations using colligative property values and vice versa. 3. Explain rates of reaction, rate laws, and half-life, determine the rate, rate law and rate constant of a reaction and calculate concentration as a function of time and vice versa, as well as explain the collision model of reaction dynamics and derive a rate law from a reaction mechanism, evaluating the consistency of a mechanism of a given rate law. 4. Describe the dynamic nature of chemical equilibrium and its relation to reaction rates, and apply Le Chatelier’s Principle to predict the effect of concentration, pressure and temperature changes on equilibrium mixtures as well as describe the equilibrium constant and use it to determine whether equilibrium has been established, and calculate equilibrium constants from equilibrium concentrations and vice versa. 5. Describe the different models of acids and base behavior and the molecular basis for acid strength, as well as apply equilibrium principles to aqueous solutions, including acid-base and solubility reactions, and calculate pH and species concentrations in buffered and unbuffered solutions. 6. Explain titration curves and speciation diagrams, as well as calculate concentrations of reactants from the former and determine dominant species as a function of pH from the latter. 7. Explain and calculate the thermodynamic functions, enthalpy, entropy and Gibbs free energy, for a chemical system, and relate these functions to equilibrium constants and reaction spontaneity; balance redox equations, express them as two half reactions and evaluate the potential, free energy and equilibrium K for the reaction, as well as predict the spontaneous direction. 8. Construct a model of a galvanic or electrolytic cell; or describe organic

	reactions. 9. Describe bonding theories, such as valence and molecular orbital theory.
College-Wide Student Learning Outcomes measured (General education courses only)	1. Critical Thought
Program Student Learning Outcomes measured	1. The student should be able to communicate effectively using oral and written reports containing technical data.