## CHEM1111 - General Chemistry I

| Credits:                        | 5 (4/1/0)  |
|---------------------------------|--|
| Description:                    | Meets MnTC Goal Areas 2 and 3. This course is the first of a two-course series (CHEM1111 and CHEM1112) intended for science majors. Students will learn the general chemistry principles: problem solving, nomenclature, atomic structure, electronic structure, stoichiometry, titration, reaction types, molecular structure, thermochemistry, electronic structure, and properties and laws of gases. The course includes a lab. Students completing the two-semester sequence will be competent in all areas listed in General Chemistry I & II of the Minnesota State Chemistry Transfer Pathway. |
| Prerequisites:                  | • MATH1020   |
| Corequisites:                   |  |
| Pre/Corequisites <sup>*</sup> : |  |



| Competencies:    | <ol> <li>Apply dimensional analysis with proper attention to units and significant figures.</li> <li>Describe and apply the scientific method used by scientists in solving problems.</li> <li>For ionic compounds (including those containing polyatomic ions) and simple inorganic molecular components, general structure of the atom and isotope. Determine the atomic number, mass number and number of neutrons for a specified isotope.</li> <li>Calculate the average atomic mass of an element from isotopic abundances and isotopic masses.</li> <li>Carlotate the average atomic mass of an element from isotopic abundances and isotopic masses.</li> <li>Correlate wavelength, frequency and energy of light with electron energy levels in the atoms via the photoelectric effect and the Bohr model.</li> <li>Apply wave-particle duality and the uncertainty principle to describe properties of electrons.</li> <li>Apply duence vs. core electrons and predict trends in atomic size, ionization energy, electron affinity and charges on main-group ions.</li> <li>Identify valence vs. core electrons and predict trends in atomic size, ionization energy, electron affinity and charges on main-group ions.</li> <li>Detate quantities associated with stoichiometry and using stoichiometric relationships including molar mass, number of particles, mass of reactant or product, limiting reagents and percent yields</li> <li>Determine the empirical formula of an unknown compound using composition by mass or combustion analysis data.</li> <li>Apply the First and Second Laws of Thermodynamics and thermochemical equations to relate heat energy, quantity of substance reacted, temperature measurements and/or heat capacity.</li> <li>Calculate reaction enthalpies using two methods: calorimetry data and Hess's Law with enthalpies of formation.</li> <li>Draw Lewis Structures for compounds including resonance, formal charge and exceptions to the octer rule.</li> <li>Apply the First and Second Laws of Thermodyn</li></ol> |
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| MnTC goal areas: | 2. Critical Thinking<br>3. Natural Sciences  |



<sup>\*</sup>*Can be taking as a Prerequisite or Corequisite.* 

