CHEM1111 - General Chemistry I

| Credits: | 5 (4/1/0) |
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| 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 [*] : | |



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| Competencies: | Apply dimensional analysis with proper attention to units and significant figures. Describe and apply the scientific method used by scientists in solving problems. For ionic compounds (including those containing polyatomic ions) and simple inorganic molecular compounds, given a chemical formula, give the correct name, and vice-versa. Describe atom components, general structure of the atom and isotope. Determine the atomic number, mass number and number of neutrons for a specified isotope. Calculate the average atomic mass of an element from isotopic abundances and isotopic masses. Carleite the average atomic mass of an element from isotopic abundances and isotopic masses. Apply wave-particle duality and the uncertainty principle to describe properties of electrons. Apply he results of the Schrödinger quantum mechanical model of the atom to assign quantum numbers to electrons, and write electron configurations of multi-electron atoms and ions. I dentify valence vs. core electrons and predict trends in atomic size, ionization energy, electron affinity and charges on main-group ions. Calculate quantities associated with stoichiometry and using stoichiometric relationships including molar mass, number of particles, mass of reactant or product, limiting reagents and percent yields Destrime the empirical formula of an unknown compound using composition by mass or combustion analysis data. 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. Calculate reaction enthalpies using two methods: calorimetry data and Hess's Law with enthalpies of formation. Apply the First and Second Laws of Thermodynamics and thermochemical equations to relate heat energy, quantity of substance reacted, temperature measurements and/or he |
| MnTC goal areas: | 2. Critical Thinking 3. Natural Sciences |



^{*}*Can be taking as a Prerequisite or Corequisite.*

