To satisfy the minimum requirements for this course, you should be able to:

1. Discuss the nature of energy by:
   - comparing and contrasting kinetic and potential energy
   - identifying heat (q) and work (w) as the two forms of transient energy (energy transfer)
   - distinguishing between heat (q), internal energy (U) and temperature (T)

2. Demonstrate an understanding of thermochemistry by:
   - explaining the relationships among the following: system, surroundings, and universe; exothermic process and endothermic process; internal energy (U) and enthalpy (H); \( \Delta U \), \( \Delta H \), q, and qp
   - associating the sign of \( \Delta H \) with whether the process is exothermic or endothermic
   - calculating the quantity of heat involved in a reaction given the quantity of reactants and the enthalpy change for the reaction
   - calculating the amount of reactant needed to generate a given amount of heat
   - distinguishing between state functions and path functions and identifying examples of each
   - stating the first law of thermodynamics in words and performing calculations using the first law for a closed system (\( \Delta U = q + w \))
   - explaining the sign conventions for heat and work

3. Demonstrate an understanding of the concept of calorimetry by:
   - understanding the concept of specific heat capacity (C)
   - performing calculations using the equation \( q = C \Delta T \) (or \( q = \text{mass} \ C_s \ \Delta T \), \( q = \text{mol} \ C_m \ \Delta T \))
   - using constant pressure calorimetry data to calculate the standard reaction enthalpy (\( \Delta H^\circ = q_p \)) or to calculate the specific heat of a substance

4. Name the six phase change processes and be able to:
   - use Kinetic Molecular Theory to explain the relative energy changes associated with each phase change (\( \Delta H_{\text{vap}} \), \( \Delta H_{\text{fus}} \), \( \Delta H_{\text{sub}} \))
   - use heat capacities and heats of fusion and vaporization to calculate the heat absorbed or evolved when a substance is heated or cooled and undergoes phase changes

5. Calculate the standard enthalpy of reaction (\( \Delta H^\circ \)) using:
   - standard enthalpies of formation (\( \Delta H^\circ \)) of reactants and products (direct method)
   - Hess's law (indirect method)

6. NavApp: Explosives
   - describe the characteristics of explosions and explosives, and describe the main causes of the destructive power of chemical explosives
   - distinguish between high and low explosives, and explain the uses of each
   - understand the terms deflagrate, detonate, shock wave, and burning front
   - recognize why nitrogen is generally found in the chemical structure of most explosives
   - approximate the energy change for an explosion by calculating the enthalpy change for the explosion reaction
   - calculate the temperature change of gases formed in an explosion