

Course Title & Number: General Chemistry I CHE *H122

Competency Area: **SCIENTIFIC KNOWLEDGE / UNDERSTANDING** (Goal: Students will gain a broad base of scientific knowledge and methodologies in the natural sciences. This will enable them to develop scientific literacy, the knowledge and understanding of scientific concepts and processes essential for personal decision making and understanding scientific issues.)

Faculty submitting the Learning Outcomes: Alex J. Zozulin

Date: February 25, 2013

[Instructions: Please match the Learning Outcomes in the left hand column to those of the course you are submitting for Gen Ed approval. List the corresponding course outcomes in the right hand column to indicate a match.]

BOR TAP's Learning Outcomes	Corresponding Outcomes for Course Named Above
1. Communicate using appropriate scientific terminology.	Describe the factors determining the physical state of matter using appropriate terminology Explain the changes in physical properties of solutions, both quantitatively and qualitatively Describe the characteristics of crystalline solids including the factors holding the solid together, the packing in crystalline solids, physical properties, and method to obtain structure information Describe the three Laws of Thermodynamics and the information provided by each law using appropriate terminology Explain the information gained from the study of chemical kinetics and its the molecular basis. Describe chemical equilibrium, the information it provides, and its application to stoichiometry Describe oxidation – reduction reactions and its application to energy production Describe coordination compounds to include their bonding and structure Produce a written document containing experimental data, the results, and the significance of the results using appropriate terminology Identify chemical substances by applying their correct chemical names Categorize chemical reactions by name and provide names of reactants and products
2. Use representations and models to communicate scientific knowledge	Apply the principles of dimensional analysis to problem solving Use bonding theories to describe the bonding in crystalline solids and

and solve scientific problems.	<p>predict physical properties of the substance</p> <p>Use the concept of intermolecular forces to predict physical properties of liquids</p> <p>Apply mathematical modeling to solutions to express the relationship between variables and to solve problems involving solution properties</p> <p>Use the Laws of Thermodynamics as the basis to describe the relationship between energy changes of a system</p> <p>Apply the Laws of Thermodynamics to solve for energy changes in a chemical system</p> <p>Use the concept of chemical equilibrium to solve stoichiometry</p> <p>Apply the mathematical model for chemical kinetics to predict reaction rates</p>
3. Plan and implement data collection strategies appropriate to a particular scientific question.	<p>Analyze an experimental approach to solve a scientific question</p> <p>Collect laboratory data based on this approach such that the results will provide a solution to the scientific question</p>
4. Articulate the reasons that scientific explanations and theories are refined or replaced.	<p>Explain the role of experimentation in the development of theories</p> <p>Explain the significance and limitations of the theory describing properties of an ideal solution and the requirement for refinements in that theory</p>
5. Evaluate the quality of scientific information on the basis of its source and the methods used to generate it.	<p>Apply chemical principles to differentiate between reasonable and unreasonable scientific information</p> <p>Use chemical principles to evaluate the methods to obtain scientific information</p>
	<i>Additional Outcomes</i>