OUTCOMES BASED LEARNING MATRIX

Course Description: This course in general chemistry is designed for those students who plan to continue in science or a science related area. The structure of the atom, modern chemical bonding, stoichiometry, states of matter. kinetic theory, gas laws, and solutions are the major topics covered. Lecture: 3 hours. Labratory: 2 hours.
Prerequisite: High school algebra or equivalent or instructor's approval.

Course: General Chemistry I CHEM 151 Department: Physical Science Revised: Fall 2007

At the end of the course, students will be able to: **Students will participate in:** **Faculty will evaluate:**

COURSE OUTCOMES	OUTCOME ACTIVITIES	Assessment Tools
Introduction: -define and describe how matter is classified. -differentiate between the concepts of mass and weight, heat and temperature, accuracy and precision. -use significant figures correctly in solving problems.	- lectures, discussions, and demonstrations. (CT, QS, OC) -reading the text, including sample problems. (CT, R, QS) -solving assigned problems. (CT, R, QS) -experiments during laboratory sessions. -see attached lab schedule: labs # 1,2,3,4. (CT, R, QS, TS) -organizing and documenting information in lab reports. (CT, W, QS)	-Tests with emphasis on solving problems (CT, W, R, QS) -Lab performance (CT, QS, TS, R, OC) -Lab reports (W, QS, CT)
Stoichiometry: -be able to solve problems involving per-cent composition, mass-mole conversions, limiting reagent and per-cent problems,	- lectures, discussions, and demonstrations. (CT, QS, OC) -reading the text, including sample problems. (CT, R, QS) -solving assigned problems. (CT, R, QS)	-Tests with emphasis on solving problems (CT, W, R, QS) -Lab performance (CT, QS, TS, R, OC) -Lab reports (W, QS, CT)

molarity and weight per-cent problems. -be able to balance equations.	-experiments during laboratory sessions. -see attached lab schedule: labs # 5, 6, 7, 8. (CT, R, QS, TS) -organizing and documenting information in lab reports. (CT, W, QS)	
The Modern Atom: -identify the parts of the electro-magnetic spectrum. -show the relationship of wavelength and frequency to the electro-magnetic spectrum. -trace the history mf the modern atom (1895-1925) through the work of Thomson, Roentgen, Becquerel, Curie, Bohr, Heisenberg, deBroglie and Schrodinger. -be able to write out the electronic configurations of the first 30 elements. -be able to identify trends in the periodic table for atomic size, ionization energy and electronegitivity.	- lectures, discussions, and demonstrations. (CT, QS, OC) -reading the text, including sample problems. (CT, R, QS) -solving assigned problems. (CT, R, QS) -experiments during laboratory sessions. -see attached lab schedule: labs # 9,10, 11, 12. (CT, R, QS, TS) -organizing and documenting information in lab reports. (CT, W, QS)	-Tests with emphasis on solving problems (CT, W, R, QS) -Lab performance (CT, QS, TS, R, OC) -Lab reports (W, QS, CT)
Chemical Bonding: -use the octet rule to predict the formulas of ionic and covalent compounds. -write Lewis Structures for covalent molecules and ions. -predict the shapes of molecules and ions using the VSEPR Theory.	- lectures, discussions, and demonstrations. (CT, QS, OC) -reading the text, including sample problems. (CT, R, QS) -solving assigned problems. (CT, R, QS) -experiments during laboratory sessions. -see attached lab schedule: labs # 13, 14. (CT, R, QS, TS)	-Tests with emphasis on solving problems (CT, W, R, QS) -Lab performance (CT, QS, TS, R, OC) -Lab reports (W, QS, CT)

-show the 5 types of hybridization. -use Molecular Orbital Theory to show bonding in bi-molecular molecules.	-organizing and documenting information in lab reports. (CT, W, QS)	
The Gaseous State: -solve problems using Boyle's Law, Charles' Law, The Combined Law, The Ideal Gas Law and Graham's Law. -state the principal points of the Kinetic Theory of Gases and relate to the gas laws. -explain the limitations of the gas laws in terms of the Kinetic Theory of Gases. -lectures, discussions and demonstrations. (CT, QS, OC) -reading the text, including sample problems. (CT, R, QS) -solving assigned problems. (CT, R, QS) -experiments during laboratory sessions. (CT, R, QS, TS) -organizing and documenting information in lab reports. (CT, W, QS)		-Tests with emphasis on solving problems. (CT, W, R, QS) -Lab performance (CT, QS, TS, R, OC) -Lab reports (W, QS, CT)

General Chemistry I
CHEM 151
Fall 2005
Laboratory Exercises

Week of September 5:	#1	Laboratory Safety talk. Probably the most important lab session of the semester!	Week of October 24:	#8	In lab problem session. Students will work on various types of problems we covered in class. Prep for exam #2.
Week of September 12:	#2	Measurement lab to learning to use the various measuring devices for measuring mass, volume, length and temperature.	Week of October 31:	#9	Standardization of NaOH solution against a primary standard and
Week of September 19:	#3	Identification of a substance by determination of physical properties	Week of November 7:	#10	Determination of the amount of citric acid in various citrus fruits (lemons, limes, grapefruit).
Week of September 26:	#4	In lab problem session. Students will work on various types of problems we covered in class. Prep for exam #1	Week of November 14:	#11	In lab problem session. Students will work on various types of problems we covered in class. Prep for exam #3.
Week of October 3:	# 5	Determination of the empirical formula of a compound.	Week of November 21:		No lab. Turkey Day
Week of October 10:	#6	Visible spectroscopy lab. Learning to use the Spec 20. Determination of a λmax for a compound and the determination of the concentration of an unknown.	Week of November 28:	#12	Determination of the Molecular Weight of a gas.
			Week of December 5:	#13	In lab problem session. Students will work on various types of problems we covered in class. Prep or exam #4
Week of October 17:	#7	Discussion of acids and bases. Practice titration lab with HCl and NaOH .	Week of December 12:	#14	Review for Final Exam