MASTER COURSE OUTLINE
Prepared By: Date: Sep 2017

COURSE TITLE
General Chem w/Lab II

GENERAL COURSE INFORMATION

Dept.: CHEM&	Course Num: 162	(Formerly:)
CIP Code: 40.0501	Intent Code: 11	Program Code: N/A
Credits: 5		
Total Contact Hrs Per Qtr.: 71.5		
Lecture Hrs: 38.5	Lab Hrs: 33	Other Hrs: 0
Distribution Designation: Lab Science LS		

COURSE DESCRIPTION (as it will appear in the catalog)
The second in a three-quarter series examining the principles of General Chemistry with the primary emphasis on inorganic chemistry. Topics include**:** Chemical equilibrium, gas laws, molecular geometry, introduction to solution chemistry (acids and bases, precipitation reactions, redox chemistry), reaction rates and states of matter. Relevance of course material to current practices in chemistry is a fundamental focus.

PREREQUISITES
Successful completion of CHEM& 161 or instructor's permission.

TEXTBOOK GUIDELINES
A current General Chemistry text sufficient to cover the full year. A typical example is Ebbing and Gammon, *General Chemistry*. A current General Chemistry laboratory manual. A typical example is Slowinski and Wolsey, *Chemical Principles in the Laboratory*. Both texts need departmental approval.

COURSE LEARNING OUTCOMES
Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills:

1. Apply the Ideal Gas Law to gaseous systems.
2. Understand the Kinetic Theory of an ideal gas.
3. Generate Lewis Dot Structures for most molecules.
4. Describe covalent and ionic bonds.
5. Predict the geometry of a simple molecule by application of the Valance Shell Electron Pair Repulsion Model (VSEPR).
6. Apply Molecular Orbital Theory to predict energy levels of electrons in diatomic molecules.
7. Identify and describe the characteristics of the three states of matter.
8. Calculate and express solution concentrations in terms of molarity, molality, mole fraction and mass percent.
9. Predict the effect of concentration on the colligative properties of a solution.
10. Determine reaction rates from experimental data.
11. Determine equilibrium constants and use equilibrium constants in calculations.

12. Recognize acid and base character of molecules and predict reactions.
13. Distinguish between strong and weak common acids and bases.
14. Describe the mathematical basis of the pH concept.

INSTITUTIONAL OUTCOMES

IO2 Quantitative Reasoning: Students will be able to reason mathematically.

COURSE CONTENT OUTLINE

Molecular Geometry
- VSEPR model
- Valance bond theory
- Molecular orbital theory

The Gaseous State
- Empirical gas laws
- Ideal gas laws
- Kinetic Molecular Theory of Gases

Liquids and solids
- Phase transitions
- Properties of liquids
- Types of solids

Solutions
- Solution concentration and units
- Solubility
- Colligative properties

Rates of reaction
- Experimental determination of reaction rate
- Determination of rate constants
- Determination of rate law
- Effect of catalysis

Equilibrium
- Dynamic equilibrium
- Determination of the equilibrium constant
- Qualitative interpretation of equilibrium
- Le Chatelier's Principle
- Catalysis

Acids and bases
- Arrhenius, Lewis and Bronsted-Lowry concept of acids and bases
- Molecular structure and acid strength
- pH of water

DEPARTMENTAL GUIDELINES *(optional)*

Evaluation will be accomplished by a combination of graded homework, examination, quizzes and laboratory performance and write up.

The final grade will be based on a percentage of the total points possible:
A typical breakdown of the points is: Three unit exams comprise approximately 40% of the total score, the final exam approximately 20%, laboratories approximately 24%, quizzes and homework provide the balance of the points.

PO5 should be assessed: Students will be able to solve problems by gathering, interpreting, combining and/or applying information from multiple sources.

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DIVISION CHAIR APPROVAL **DATE**