Coffeyville Community College

CHEM-103

COURSE SYLLABUS

FOR

PRINCIPLES OF CHEMISTRY I

Amy Lumley
Instructor

COURSE NUMBER: CHEM-103 **COURSE TITLE:** Principles of Chemistry I

CREDIT HOURS: 5

INSTRUCTOR: Amy Lumley

OFFICE LOCATION: Room 202B, Chemistry Lab, Arts and Sciences Building

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OFFICE HOURS: See schedule posted on office door

PREREQUISITE(S): Intermediate Algebra or Equivalent

REQUIRED TEXT AND MATERIALS: Brady. Chemistry: Matter and Its Changes. Fourth Ed.
Calculator

COURSE DESCRIPTION: This course is designed for science majors, engineers, medically related majors, pharmacy majors, etc. Topics include measurement, atomic theory, periodic properties, formulas, equations, bonding, molecular geometry, solution stoichiometry, gases, solids, and liquids.

EXPECTED LEARNER OUTCOMES: Upon completion of this course, the student will be able to:

1. Identify atoms and elements.
2. Identify compounds.
3. Understand how to take and use measurements.
4. Understand chemical reactions.
5. Understand aqueous reactions.
6. Identify oxidation-reduction reactions.
7. Relate the idea of energy to chemistry.
8. Become familiar with the quantum mechanical atom.
9. Understand chemical bonding
10. Differentiate between the states of matter.

LEARNING TASKS & ACTIVITIES: The class will meet during the scheduled class time for lecture and discussion. Lab periods will be used for experimentation and/or discussion.

ASSESSMENT OF

OUTCOMES: The following evaluative techniques will be used:

1. Lecture Exams
2. Lab Quizzes
3. Lab write ups
4. Lecture Quizzes/Attendance
5. Lecture Final

All assignments will be assigned points. At the end of the semester, your total points will be divided by the total possible to arrive at a percentage. The grading scale is as follows:

90-100%	A
80-89%	B
70-79%	C
60-69%	D
0-59%	F

ATTENDANCE POLICY: Each student is expected to attend all lectures, discussions, and labs. Attendance will be taken daily. It is the responsibility of the student to make arrangements with the instructor for make-up work **BEFORE** going on a field trip or other college-sponsored events. If a student does not make up the missed work within a week, a **ZERO** will be assigned to the missed work. Only excused absences will be accepted for make-up work.

ACADEMIC INTEGRITY: Dishonesty of any kind on examinations or on assignments will not be tolerated.

COMPETENCIES:

IDENTIFY ATOMS AND ELEMENTS

1. Compare and identify physical vs. chemical changes.
2. Differentiate among the three states of matter.
3. Distinguish among the classes of matter.
4. Identify and compare the subatomic particles.
5. Recognize and interpret isotopic notation.
6. Use periodic table to predict properties of the elements.

IDENTIFY COMPOUNDS

1. Identify and describe characteristics of ionic and covalent compounds.
2. Demonstrate ability to name simple inorganic molecules.
3. Relate the name of a compound to a formula.

UNDERSTAND HOW TO TAKE AND USE MEASUREMENTS

1. List the basic SI units.
2. List the common metric prefixes.
3. Use significant figures in calculations.
4. Convert between English and metric units.
5. Perform calculations using density.

UNDERSTAND CHEMICAL REACTIONS

1. Calculate molecular and formula mass.
2. Distinguish between empirical and molecular formulas from appropriate data.
3. Understand the concept of the mole.
4. Convert between mass, moles, and formula units.
5. Balance chemical equations.
6. Calculate theoretical yield from stoichiometric data.
7. Determine limiting reagents and percent yield from stoichiometric data.

UNDERSTAND AQUEOUS REACTIONS

1. Write molecular, ionic, and net ionic equations.
2. Predict products in double replacement reactions, including precipitation and acid/base.
3. Distinguish between strong and weak acids and bases.
4. Calculate the concentration of a solution.
5. Describe how to prepare a solution.
6. Describe a titration.

IDENTIFY OXIDATION-REDUCTION REACTIONS

1. Assign oxidation numbers.
2. Determine oxidation/reduction agents.
3. Use activity series to predict single replacement reactions.
4. Predict products in combustion of hydrocarbons.

RELATE IDEA OF ENERGY TO CHEMISTRY

1. Compare kinetic and potential energy.
2. Describe energy requirements when bonds are made or broken.
3. Compare endothermic and exothermic reactions.
4. Calculate specific heat capacity.
5. Describe calorimetry.
6. Calculate enthalpy changes using heat of reactions, thermochemical equations, Hess' Law, and standard enthalpy of formation.

BECOME FAMILIAR WITH THE QUANTUM MECHANICAL ATOM

1. Briefly discuss how the history of the atom has led to the adoption of modern atomic theory.
2. Describe the characteristics of waves, including electromagnetic radiation.
3. Discuss the wave-particle duality.
4. Describe what each of the quantum numbers refer to.
5. Write electron configuration and orbital diagrams for atoms.
6. Discuss relation between electron configuration, ability to predict properties, and placement on periodic table.

UNDERSTAND CHEMICAL BONDING

1. Draw Lewis dot structures for atoms and simple compounds.
2. Predict preferred Lewis structures using formal charges.
3. Explain how electronegativity differences relate to bond polarity.
4. Predict shapes of simple molecules and ions using the VSEPR theory.

DIFFERENTIATE BETWEEN THE STATES OF MATTER

1. Describe the general properties and differences between solids, liquids, and gases.
2. Describe the four variables that affect the properties of a gas.
3. Describe the Kinetic Molecular Theory.
4. Use the ideal gas equation in problem solving.
5. Compare diffusion and effusion.

6. Discuss the difference in real and ideal gases.

This syllabus is subject to revision with prior notification to the student by the instructor.

Last revised: 01/03/2010