

Course Syllabus

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Catalog Description: CHEM 105. Introductory Chemistry I. 3 3 0. Prerequisite or corequisite: MATH 101. Nature and properties of matter including the common elements and their compounds. Periodic classification, atomic and molecular theories, nuclear chemistry, and the relation of atomic and molecular structure to chemical behavior, stoichiometry, nomenclature. For students needing more than one year of chemistry. Degree credit will not be given for both CHEM 101 and 105. This course is also available via Internet. Basic computer knowledge is required for students enrolled in the Internet section. (40.0501)

Prerequisite or corequisite: MATH 101

Required Text/Other Materials: *Chemistry: Matter and its Changes* by J. Brady and F. Senese, 4th ed. (2004). A SCIENTIFIC CALCULATOR WILL ALSO BE NEEDED

Supplemental Readings: A course website will be available on the Blackboard server. Talk to the instructor if you do not know how to access this resource.

Course Goals: Provide students with an understanding of the general principles of chemistry and to encourage the ability to apply these principles to chemical problem solving. The student will develop an understanding of the interconnectedness of chemistry to the other sciences and will relate the concepts of chemistry to contemporary, historical, technological and societal issues.

Student Outcome Objectives: At the end of this course the student will understand and be able to apply the following concepts to problem solving:

- Atomic theory, the periodic table, correct use of the terms atom, molecule, element, compound, writing formulas of compounds and proper use of inorganic nomenclature.
- Units of measure, unit conversions, uncertainties in measurements, density and definitions of matter.
- Atomic and molecular masses, mole calculations and Avogadro's number, mass relations in chemical formulas and reactions including percent composition, empirical and molecular formulas, theoretical and chemical reaction yields, limiting reagents
- Writing and balancing chemical reactions including precipitation reactions, acid/base reactions, and oxidation-reduction reactions.
- Kinetic and potential energy, heat, chemical energy, heats of reaction and thermochemical equations
- Theory of light and atomic spectra, quantum theory and quantum numbers, electron configurations, and periodic trends in the properties of elements.
- Molecular bonding and geometry, including Lewis electron dot structures, molecular geometry, formal charge, polarity of molecules, hybridization of atomic orbitals and VSEPR theory of molecular geometry.
- Measurements in gaseous systems, including Ideal gas law, stoichiometry of gaseous reactions, partial pressures of gaseous mixtures and mole fractions, effusion of gases (Graham's law) and Dalton's Law of partial pressures.

Competencies students will acquire at the successful completion of the course: explain and demonstrate the Louisiana K-12 benchmarks related to:

- properties and changes of properties of matter (PS-M-A1 through A9)
- transformations of energy (PS-M-C1, C2, C3, C7)

- measurement and symbolic representation (PS-H-A1, A2)
- atomic structure (PS-H-B1 to B3)
- structure and properties of matter (PS-H-C1 to C5)
- chemical reactions (PS-H-D1, D3, D5, D7)
- energy (PS-H-F2),
- interaction of energy and matter (PS-H-G1)
- understanding scientific inquiry (SI-M-B2, B3, SI-H-B2)

Course Content

Chapter 1 – *Atoms and Elements: The Building Blocks of Chemistry*
Scientific method, properties of materials, atoms, periodic table

Chapter 2 – *Compounds and Chemical Reactions*
Compounds, chemical reactions, chemical equations, molecules, nomenclature, ions, ionic compounds

Chapter 3 – *Measurement*
Units, significant figures, unit conversion, density

Chapter 4 – *The Mole: Connecting the Macroscopic and Molecular Worlds*
The mole, stoichiometry, balancing equations, limiting reagent, yield

Chapter 5 – *Reactions Between Ions in Aqueous Solutions*
Solutions, solubility and precipitation, acids and bases, neutralization, metathesis reactions, concentration and molarity

Chapter 6 – *Oxidation-Reduction Reactions*
Oxidation and reduction, stoichiometry of redox reactions

Chapter 8 – *The Quantum Mechanical Atom*
Electromagnetic radiation, orbitals, electron configurations

Chapter 9 – *Chemical Bonding: General Concepts*
Ionic bonding, Lewis symbols, covalent bonding, polar covalent bonding, electronegativity, Lewis structures, coordinate bonding

Chapter 10 – *Chemical Bonding and Molecular Structure*
VSEPR and molecular geometry, polarity of molecules, hybridization, multiple bonding, resonance

Grading: There will be three(3) in-class hour exams (100 pts. each) covering chapters 1-2, 3-5, and 6-7. A fourth exam, covering chapters 8-10 (100 points) will be given on the same date and simultaneously with the final exam (150 pts.). The lowest of the 4 hourly exam grades will be dropped in computing your class average. Assigned homework problem will be accessed and performed online at <http://phsc-server.nicholls.edu/assign.htm> and be counted as 5 points each. Final course grades will be determined using the following scale: **A:** 90-100% **B:** 80-90% **C:** 70-80% **D:** 60-70% **F:** <60%

Make-up Policy: **NO Make-ups.** If you miss an exam it's zero will count as your lowest score

Attendance Policy: Attendance will be taken and, occasionally, extra credit quizzes may be administered in class with no prior warning. No excuses are necessary for missing class. The student is responsible for making up any missed work. Attendance is essential to successful completion of this course.

Academic Honesty Policy: Students judged guilty of academic misconduct will be subject to the penalties stated in Student Code of Conduct including but not limited to a score of undroppable zero on the exam or homework in question, expulsion from the class and/or expulsion from the University.

Course Withdrawals: The last day to withdraw from the class with a 'W' is Thursday, 7 April, 2005.

Academic Disabilities Policy: If you have a documented disability that requires assistance, you must register with the Office of Disability Services for coordination of your academic accommodations. The Office of Disability Services is located in Peltier Hall, Room 100-A. The Phone Number is (985) 448-4430 (TDD 449-7002).

Class Disruptions are not tolerated. The use of cell phones, pagers and/or any other electronic personal device in class is prohibited. Any infractions will result in the dismissal from class.