

Bossier Parish Community College
Master Syllabus

Course Prefix and Number: CHEM 101

Credit Hours: 3

Course Title: General Chemistry I

Course Prerequisites: ACT Math score of 20 or MATH 102. It is strongly suggested that students should have completed a high school chemistry course or CHEM 107.

Textbook: Chang, R. and Goldsby, K.; General Chemistry: The Essential Concepts, 7th edition

Course Description:

This course provides the student with the fundamental skills and knowledge required for a continued study of chemistry and related sciences. Topics to be covered include nomenclature, atomic and molecular structure, chemical equations, stoichiometry, gas laws, bonding, energy relationships, solutions, and quantitative problem solving.

Learning Outcomes:

At the end of this course, the student will:

- A. apply algebraic skills to construct and utilize conversion factors to accurately convert measurements between standard units and perform chemical calculations;
- B. evaluate a chemical compound in terms of its electronic structure, shape, composition, empirical formula, nomenclature, and reactivity;
- C. categorize chemical reactions in terms of thermodynamics, mass conservation, and reaction kinetics; and
- D. apply physical laws to various states of matter and predict physical changes inherent with parameter adjustments.

To achieve the learning outcomes, the student will

- 1. relate the atomic number, atomic mass, an atomic symbol to the number of subatomic particles located in atoms of the periodic table. (B)
- 2. recognize the 7 fundamental SI base units and their abbreviations. (A)
- 3. convert from one metric unit to another. (A)
- 4. convert temperatures from Fahrenheit, Celsius and Kelvin scales. (A)
- 5. determine the number of significant figures in a number and express. (A)
- 6. calculate density, or use density to calculate mass or volume. (A)
- 7. state Dalton's atomic theory and use the law of multiple proportions. (B)
- 8. determine the number of subatomic particles in an atom. (B)
- 9. determine if a compound is ionic or covalent and relate this to the compound's physical properties. (B)
- 10. recognize the common acids and bases. (B)

11. name chemicals by the IUPAC system. (B)
12. balance chemical equations. (C)
13. use scientific notation in calculations, and know the numerical value of a mole. (A)
14. calculate the molecular weight and formula weight. (A,B)
15. use stoichiometry and balanced equations to find the mass of reactants or products in a reaction. (A,C)
16. express the concentration of solutions in molarity. (A)
17. determine empirical formulas and molecular formulas of compounds. (A,B)
18. recognize the three main types of reactions. (C)
19. use the solubility rules to predict when a precipitation will occur. (C)
20. recognize strong acids and strong bases. (B)
21. write and balance oxidation/reduction reactions. (A,C)
22. use the activity series to predict reactions. (C)
23. relate the gas laws to the temperature, pressure, volume, and amount of a gas present under certain conditions. (A,D)
24. compare and contrast the physical properties of solids, liquids, and gasses. (A,D)
25. relate the five postulates of the kinetic molecular theory of gases to the ideal gas law. (A,D)
26. calculate the enthalpy change for a reaction from calorimetry data or from enthalpies of formation and estimate reaction enthalpies from bond energies. (A,D)
27. determine the reaction entropy from standard molar entropies. (A,D)
28. calculate work and heat. (A,D)
29. calculate frequency, wavelength, and energy. (A,B)
30. use De Broglie's equation to determine the wavelength of a particle that doesn't necessarily travel in waves. (A,B)
31. relate quantum numbers to the position of electrons in an atom. (A,B)
32. write electron configurations for atoms. (B)
33. relate electron configurations to atoms. (B)
34. relate electron configuration to periodic properties and chemical reactions. (B)
35. use the periodic table to classify elements. (B)
36. write the electron configuration of ions. (B)
37. use electron configurations to predict ionization energies and electron affinity. (B)
38. state some descriptive information about groups I, II, III, VII, and VIII of the periodic table. (B)
39. write representative reactions of periodic groups I, II, III, VII, and VIII of the periodic table. (B)
40. use the octet rule to predict reactions of these groups. (B)
41. predict whether a bond is ionic, covalent, or polar covalent by using electronegativity values. (B)
42. draw electron-dot structures of polyatomic molecules. (B)
43. recognize that resonance arises from multiple possible Lewis structures. (B)
44. calculate formal charges on an atom in a Lewis Structure. (A,B)
45. recognize exceptions to the Octet Rule. (B)
46. use bond dissociation energies to calculate enthalpy of reaction. (A,C)

47. use the VSEPR model to visualize the shape of a molecule. (A,B)
48. use the valence bond theory to describe the electronic structure of polyatomic molecules. (B)
49. use the valence bond theory to describe the electronic structure of covalent molecules. (B)
50. predicting the dipole moment of molecules. (B)
51. predicting the hybridization of atoms in molecules. (B)

Course Requirements

In order to receive a grade of "C" the student must earn 70% of the total possible points for the courses and achieve all of the following course requirements.

- minimum average of 70% on tests
- minimum score of 50% on the comprehensive final test
- satisfactory completion of homework (70%) assignments

Course Grading Scale:

- A- 90% or more of total possible points and minimum average of 70% on tests and a minimum score of 50% on the comprehensive final test and satisfactory completion of homework assignments
- B- 80% or more of total possible points and minimum average of 70% on tests and a minimum score of 50% on the comprehensive final test and satisfactory completion of homework assignments
- C- 70% or more of total possible points and minimum average of 70% on tests and a minimum score of 50% on the comprehensive final test and satisfactory completion of homework assignments
- D- 60% or more of total possible points and minimum average of 60% on tests and a minimum score of 50% on the comprehensive final test and satisfactory completion of homework assignments
- F- less than 60% of total possible points or less than 60% average on tests or less than 50% on the comprehensive final test or failure to satisfactorily complete homework assignments

Attendance Policy: The college attendance policy is available at <http://www.bpsc.edu/catalog/current/academicpolicies.html>

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COORDINATOR FOR SECTION 504 AND ADA

Angie Cao, Student and Disability Services Specialist

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Equity/Compliance Coordinator

Teri Bashara, Director of Human Resources

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Bossier City, LA 71111

Phone: 318-678-6056

Hours: 8:00 a.m.-4:30 p.m. Monday - Friday, excluding holidays and weekends.

Reviewed by D. Hoston 05/19