



Wisconsin Indianhead Technical College

10806140 Chemistry

Course Outcome Summary

Course Information

Description	This is a combined lecture/laboratory course for those entering health occupations programs. You will study chemical bonds and the solution process; chemical reactions and chemical equilibria; and acids and bases. You will participate in labs where appropriate. No previous background in chemistry is required. Good math skills are helpful.
Instructional Level	Associate Degree
Total Credits	1.00
Total Hours	24.00

Types of Instruction

Instruction Type	Credits/Hours
Presentation (Lecture/Demonstration/Discussion)	.5/8
Lab and/or Shop Experience	.5/16

Course History

Revised By Andrea Schullo (andrea.schullo)

Course Competencies

1. Use appropriate scientific equipment, methods, and safety precautions

Domain Cognitive Level Application Status Active

Assessment Strategies

1.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 1.1. you identify safety hazards and use protective equipment in the laboratory
- 1.2. you follow established procedures for personal and group safety and report unsafe conditions
- 1.3. you clean your area at the conclusion of the lab session
- 1.4. you follow the scientific method in your experiments

Learning Objectives

1.a. Identify safety hazards and protective equipment in the laboratory

- 1.b. Interpret instructions and observe phenomena
- 1.c. Predict and summarize results

2. Demonstrate use and understanding of basic mathematical, chemical, and physical concepts

Domain Cognitive Level Application Status Active

Assessment Strategies

- 2.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 2.1. you differentiate among chemical and physical properties
- 2.2. you differentiate among elements, molecules, compounds, and mixtures
- 2.3. you distinguish between the various forms of energy
- 2.4. you demonstrate the Law of Conservation of Energy
- 2.5. you differentiate among the states of matter

Learning Objectives

- 2.a. Distinguish between elements, molecules, compounds, and mixtures
- 2.b. Distinguish between the various forms of energy
- 2.c. Demonstrate the Law of Conservation of Energy
- 2.d. Differentiate among the states of matter
- 2.e. Differentiate among chemical and physical properties

3. Explain the structure, makeup, and uses of atoms, molecules, and compounds

Domain Cognitive Level Evaluation Status Active

Assessment Strategies

- 3.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 3.1. you correctly define "atom," "molecule," and "compound"
- 3.2. you identify the characteristics of atoms including the charge and location of subatomic particles
- 3.3. you define ion and isotope
- 3.4. you identify the number of protons, neutrons, and electrons in different atoms, isotopes, and ions
- 3.5. you identify groups, periods, metals, nonmetals and metalloids on the periodic table
- 3.6. you identify characteristics of stable molecules
- 3.7. you write proper symbols and formulae

Learning Objectives

- 3.a. Define "atom," "molecule," and "compound"
- 3.b. Identify the characteristics of atoms including the charge and location of subatomic particles
- 3.c. Determine the number of protons, neutrons, and electrons in atoms, isotopes, and ions
- 3.d. Define ion
- 3.e. Define isotope

4. Summarize pressure and the gas laws

Domain Cognitive Level Evaluation Status Active

Assessment Strategies

- 4.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 4.1. you characterize gases in terms of volume and shape
- 4.2. you distinguish how pressure affects a gas
- 4.3. you accurately determine gas characteristics using Boyle's Law, Charles' Law, and Henry's Law

Learning Objectives

- 4.a. Characterize gases in terms of volume and shape

- 4.b. Explain the principal assumptions of the Kinetic Molecular Theory
- 4.c. Explain Boyle's Law
- 4.d. Explain Charles' Law
- 4.e. Explain Henry's Law

5. Explain the structure, properties, and uses of water and different types of liquid mixtures

Domain Cognitive Level Evaluation Status Active

Assessment Strategies

- 5.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 5.1. you review the physical properties of water and water's uses in the body
- 5.2. you explain hydrogen bonding in the water molecule
- 5.3. you explain hydrolysis and dehydration synthesis
- 5.4. you define the terms: solute, solvent, solution, homogeneous, heterogeneous, colloid, suspension, and emulsion
- 5.5. you define properties of surface tension, viscosity, diffusion, and osmosis
- 5.6. you distinguish among special solutions: isotonic, hypotonic, and hypertonic

Learning Objectives

- 5.a. Review the physical properties of water and water's uses in the body
- 5.b. Explain hydrogen bonding in water
- 5.c. Explain hydrolysis and dehydration synthesis
- 5.d. Define the terms: solute, solvent, solution, homogeneous, heterogeneous, colloid, suspension, and emulsion
- 5.e. Define properties of surface tension, viscosity, diffusion, and osmosis
- 5.f. Distinguish among special solutions: isotonic, hypotonic, and hypertonic

6. Explain the properties and reactions of ions and their electrolytes

Domain Cognitive Level Evaluation Status Active

Assessment Strategies

- 6.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 6.1. you define the terms dissolve and dissociate
- 6.2. you distinguish between electrolytic and non-electrolytic solutions
- 6.3. you differentiate between strong and weak electrolytes
- 6.4. you describe body functions that depend on electrolytic solutions
- 6.5. you differentiate between ions and the parent atom
- 6.6. you identify ions and polyatomic ion groups
- 6.7. you distinguish between ionic and covalent bonds
- 6.8. you distinguish between polar and nonpolar covalent bonds

Learning Objectives

- 6.a. Define dissolve and dissociate
- 6.b. Distinguish between electrolytic and non-electrolytic solutions
- 6.c. Describe body functions that depend on electrolytes
- 6.d. Distinguish between ionic and covalent bonds
- 6.e. Distinguish between polar and nonpolar covalent bonds

7. Explain the characteristics and reactions of acids, bases, and salts

Domain Cognitive Level Evaluation Status Active

Assessment Strategies

- 7.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 7.1. you define the terms acid, base, and salt
- 7.2. you explain the function of an indicator
- 7.3. you distinguish between the properties of acids and bases
- 7.4. you identify acids and bases using the pH scale
- 7.5. you describe the role of buffers in biological systems

Learning Objectives

- 7.a. Define the terms acid, base, and salt
- 7.b. Explain the function of an indicator
- 7.c. Distinguish between the properties of acids and bases
- 7.d. Identify acids and bases using the pH scale
- 7.e. Describe the role of buffers in biological systems

8. Categorize nucleotides; adenosine triphosphate and DNA and RNA

Domain Cognitive Level Synthesis Status Active

Assessment Strategies

- 8.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 8.1. you describe DNA structure
- 8.2. you recognize the differences between RNA and DNA
- 8.3. you define DNA replication, transcription, and translation
- 8.4. you explain nitrogenous base pairing
- 8.5. you define mutation
- 8.6. you describe how a mutation could occur
- 8.7. you define codon
- 8.8. you describe the process of protein synthesis
- 8.9. you use the genetic code to determine an amino acid
- 8.10. you define ATP and its role in energy storage and release
- 8.11. you explain the energy cycle (ATP, ADP)

Learning Objectives

- 8.a. Define adenosine triphosphate (ATP) and how it relates to the energy cycle
- 8.b. Describe DNA structure
- 8.c. Differentiate between RNA and DNA
- 8.d. Define DNA replication, transcription, and translation
- 8.e. Explain how nitrogen bases pair
- 8.f. Define mutation
- 8.g. Explain how a mutation could occur
- 8.h. Define codon
- 8.i. Describe protein synthesis
- 8.j. Use the genetic code to determine an amino acid

9. Characterize carbohydrates, lipids, and proteins and their properties

Domain Cognitive Level Analysis Status Active

Assessment Strategies

- 9.1. in a written or oral assignment in the classroom and/or lab

Criteria

Your performance will be successful when:

- 9.1. you classify carbohydrates, lipids, and proteins
- 9.2. you explain the functions of carbohydrates, lipids, and proteins
- 9.3. you describe common monosaccharides (glucose, galactose, fructose)
- 9.4. you describe common disaccharides (sucrose, maltose, lactose)
- 9.5. you describe common polysaccharides (starch, cellulose, glycogen)
- 9.6. you describe the general properties of lipids

- 9.7. you differentiate between saturated and unsaturated fatty acids
- 9.8. you explain the source of proteins
- 9.9. you explain the role of diet and essential amino acids
- 9.10. you distinguish among primary, secondary, tertiary, and quaternary structures of proteins
- 9.11. you describe the properties of proteins
- 9.12. you explain how proteins can be denatured

Learning Objectives

- 9.a. Explain the functions of carbohydrates, lipids, and proteins
- 9.b. Classify carbohydrates, lipids, and proteins
- 9.c. Describe common monosaccharides (glucose, galactose, fructose)
- 9.d. Describe common disaccharides (sucrose, maltose, lactose)
- 9.e. Describe common polysaccharides (starch, cellulose, glycogen, heparin)
- 9.f. Describe the general properties of lipids
- 9.g. Differentiate between saturated and unsaturated fatty acids
- 9.h. Explain the role of proteins in the body, including enzymes
- 9.i. Distinguish among primary, secondary, tertiary, and quaternary structures of proteins
- 9.j. Explain how denaturing of protein can occur

Course Learning Plans and Performance Assessment Tasks

Type	Title	Source	Status
LP	Lab Report Assessment	Course	Active
LP	Mathematical, Physical and Chemical Concepts	Course	Active
LP	Atoms, Molecules and Compounds	Course	Active
LP	Chemical Reactions	Course	Active
LP	Gas Laws	Course	Active
LP	Water and Liquid Mixtures	Course	Active
LP	Ions and Electrolytes	Course	Active
LP	Acids, Bases and Salts	Course	Active
LP	Radioactive Particles	Course	Active
LP	Carbohydrates, Lipids and Proteins	Course	Active