



Broward Community College

Course Outline

STATUS: A

COMMON COURSE NUMBER: CHM 1093

COURSE TITLE: Principles of Chemistry for Teachers I

CREDIT HOURS: 3

CONTACT HOURS BREAKDOWN:

Lecture/Discussion 48

Lab

Other

Contact Hours/Week 3

CATALOG COURSE DESCRIPTION:

Prerequisite: None

Corequisite: None

This course is designed for middle and high school science teachers. This course covers the basic principles of chemistry with applications of these principles to every day phenomena. Lectures will include hands-on activities and demonstrations. This course will not satisfy the General Education Requirements for the A.A. degree.

General Education Requirements - Associate of Arts Degree, meets Area(s):
General Education Requirements - Associate in Science Degree, meets Area(s):

UNIT TITLES:

1. The Nature of Chemistry and Matter
2. Atomic Structure and Nuclear Change
3. Chemical Bonding and the Language of Chemistry
4. Some Practical Close-Ups

I. Course Overview:

Upon successful completion of this course, the students should be able to demonstrate competence in basic chemical skills and concepts, and recognize the relationships between chemistry and other disciplines as well as the importance of chemistry in everyday applications.

II. Units:

Unit 1. The Nature of Chemistry and Matter

General Outcome:

- 1.0 The students should be able to summarize the important aspects of chemistry, its historical development, and the modern view of matter.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Define chemistry and specify its areas of focus.
- 1.2 Outline the scientific method and discuss the differences between science, philosophy and art.
- 1.3 Define matter and summarize the ways in which it is classified.
- 1.4 Distinguish between physical and chemical properties and between physical and chemical changes.
- 1.5 Summarize important developments in the history of scientific thought and chemistry, and to state the importance contributions of specific individuals.
- 1.6 Discuss the role of chemistry among the other sciences and as a partner in modern technology.
- 1.7 Use scientific methods of measurement when discussing matter.

Unit 2. Atomic Structure and Nuclear Change

General Outcome:

2.0 The students should be able to summarize the modern concept of the atom and the historical developments that have led to this concept, and to describe some of the details relating to nuclear changes.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Summarize the views of matter held by scientists throughout history.
- 2.2 State the contributions of key individuals, such as Dalton, Mendeleev, Rutherford, Becquerel, the Curies, Bohr.
- 2.3 List and describe the important properties associated with the three major subatomic particles and specify their relative locations within the atom.
- 2.4 Interpret symbols of nuclides and explain the meaning and importance of the concept of isotopes.
- 2.5 Detail the basis for the arrangement of the elements within the table and use the periodic table to obtain information about the elements.
- 2.6 List the three types of natural radioactivity; detail the nature and properties of the particles and the changes that occur in nuclei that emit them.
- 2.7 Define the concept of half-life and perform simple calculations related to this concept.
- 2.8 List and describe the three major types of artificial nuclear changes.
- 2.9 Identify and discuss several common uses of radioactive isotopes.
- 2.10 Recognize and discuss the risks and concerns associated with nuclear changes with respect to the environment and human safety.

- 2.11 State the basic principles for the arrangement of electrons within atoms and to relate this arrangement to chemical behavior of the elements and their position within the table.
- 2.12 Recognize and write the configuration for selected elements.

Unit 3. Chemical Bonding and the Language of Chemistry

General Outcome:

3.0 The students should be able to state and apply the principles associated with chemical bonding, chemical nomenclature, and chemical equations.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 State and illustrate the two major types of chemical bonds and summarize the differences between ionic and covalent compounds.
- 3.2 Explain and apply the relationship between electronic arrangement and chemical bonding.
- 3.3 Use electron-dot notation to represent bond formation and simple compounds
- 3.4 Define and predict polarity in covalent bonds.
- 3.5 Predict the shapes of simple molecules based on the number of electron pairs present.
- 3.6 Write and interpret chemical formulas.
- 3.7 Use basic rules to name simple inorganic compounds, including those that contain familiar polyatomic ions.
- 3.8 Interpret and balance simple chemical equations.
- 3.9 Define the mole concept and use it correctly in simple calculations involving chemical equations.

Unit 4. Some Practical Close-Ups

General Outcome:

4.0 The students should be able to apply chemical principles and recognize the practical applications of chemistry in several specific topic areas.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Define and give examples of acids and bases, and list their common properties.
- 4.2 Explain and illustrate the differences between strong and weak acids and bases.
- 4.3 Define neutralization and explain its role in the familiar chemistry of acids and bases; recognize examples of neutralization reactions.
- 4.4 Explain the nature and uses of the pH scale.
- 4.5 Describe some common applications of acid and base chemistry.
- 4.6 Define the terms oxidation and reduction and recognize examples of each.
- 4.7 List the important properties of oxygen and hydrogen.
- 4.8 Describe several practical applications of oxidation-reduction chemistry, including electrochemistry, corrosion of metals, biochemistry, etc.
- 4.9 Discuss the major features of the hydrosphere, the lithosphere, and the atmosphere of the earth.
- 4.10 List the major types of minerals and components of the lithosphere.
- 4.11 Discuss the problems associated with pollution and the limitations of natural resources.